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Veterinary Medicine

VOL. XXIII SEPTEMBER, 1928 No. 9

Published Monthly by the Veterinary Magazine Corporation
4753 South Parkway, Chicago, Ill., U. S. A.
$4.00 a Year

Entered as second-class matter November 8, 1920, at the post office at Chicago, Illinois, under the Act of March 3, 1879.

Entered as second-class matter under the title of American Journal of Veterinary Medicine, July 19, 1910, at Chicago, Illinois, under Act of March 3, 1873.

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D. M. Campbell, Editor A. T. Kinsley, Associate Editor

The A. V. M. A. Meeting in Minneapolis

The 1928 session of the American Veterinary Medical Association held in Minneapolis, August 7th to 10th, will be remembered by all of the more than 1400 who attended as one of the pleasantest and most satisfactory meetings that the association has ever held.

The weather did not quite live up to the promises made for it. It was insufferably hot. But, the local committee more than fulfilled all other promises.

With the total number of veterinarians in the country decreasing from year to year and the association not quite holding its own in membership during the past six years, we still see the number attending the A. V. M. A. meetings increasing. The registration at this session exceeded by 150 the previous record attendance at Des Moines in 1924. The reason for the increasing attendance of veterinarians at A. V. M. A. meetings probably lies mainly in the greater prosperity of individual veterinarians, and they did look prosperous at Minneapolis; in the better programs that are held from year to year; and in the constant improvement of the A. V. M. A. organization as an agent for the promotion of the welfare of the profession.

The New Officers

The election of officers was a tame affair as compared with most previous elections. But one candidate was nominated for most of the offices and he proved the unanimous choice of the association.

Dr. T. E. Munce, Harrisburg, Pennsylvania, Chief of the Pennsylvania Bureau of Animal Industry and chairman of the Executive Board of the A. V. M. A., was chosen to head the association for the ensuing year. The selection is an admirable one from every point of view. For a number of years, Dr. Munce has been very active in association matters and he has been a frequent contributor to state association programs in various parts of the country. His acquaintance among members of the profession is large. He is president of the United States Live Stock Sanitary Association, an honor that came to him because of his successful adminstration of live stock sanitary affairs in Pennsylvania and because of his interest in live stock sanitary matters throughout the country.

The vice presidents are as follows: 1, S. Hadwen, Ottawa, Ontario; 2, Wm. A. Axby, Harrison, Ohio; 3. O. M. Norton, Greenville, Mississippi; 4, Lt. Col. R. C. Musser, Washington, D. C.; 5, W. G. Hollingsworth, Utica, N. Y.

Many Visitors at the Meeting

The number of ladies who came with their husbands or fathers to this meeting was astonishingly large, totaling more than 450. Only those who have had a similar experi-

ence have a concept of the magnitude of the problem of the local committee in providing four days' constant entertainment for this number of women; and perhaps a dozen children.

In taking their women folk with them to A. V. M. A. meetings in such numbers, veterinarians are laying a heavy burden on the local committee, but the local committee seems to want it so, and that the women enjoy themselves at the meetings, particularly that they thoroughly enjoyed themselves all of the time at the Minneapolis meeting, there can be no question.

The Clinic

The climax of the local committee's efforts probably culminated in the all day clinic which was held the fourth day of the meeting. Probably never has the A. V. M. A. witnessed such a clinic, either in quantity or variety. The clinic was run in six sections throughout the day, each in charge of a clinitian who had a printed program to follow and material enough to keep one or two and in a number of instances, three different demonstrations going. There was a horse clinic run in two divisions, one in the operating room and one outside; a cattle clinic; a sheep clinic; a swine clinic; a small animal clinic; and a poultry clinic.

The clinic was held at the Unversity Farm, where ample facilities were available, including bleecher seats for everyone.

The Next Meeting

Invitations were received to hold the 1929 meeting in Washington, D. C., and in Detroit, Michigan. The latter place was selected by a three to one vote.

Notice was given by Dr. A. T. Kinsley that an invitation would be extended at the Detroit meeting to hold the 1930 meeting in Kansas City.

Dr. F. M. Hayes of California also gave notice that Los Angeles would invite the association to hold its 1930 meeting in that city.

The Program

A total of 50 papers were read *in toto* or by title. Many of them detailed research work carried on during the past year; others discussed public health problems of interest to veterinarians; and still others, problems dealing with phases of practice. No complete abstract of these many discussions can be attempted at this time, but in the following, an attempt is made to report some of the discussions, delivered mainly in the General Practice Section.

A Study of the Simultaneous and Serum-Alone Methods in the Treatment of Cholera-Infected Hogs, by C. N. McBryde, U. S. B. A. I. Experiment Farm, Ames, Iowa.

Doctor McBryde gave the details of several experiments which he had conducted to ascertain whether it is better to give serum alone in cholera-infected herds or serum and virus; stating that the impression had prevailed for a long time that when a veterinarian went into a herd of swine where animals were already affected with cholera, presumably many of them in the incubation stage of the disease, that large doses of serum should be given but no virus; although theoretically the injection of a small quantity of virus in an animal whose system was already presumably loaded with the disease, should not affect him one way or the other.

The experiments, which were carefully conducted and seemed conclusive, demonstrated that there is no advantage in withholding the virus; but a number of advantages in giving it, since when serum alone is used in such herds, there will be many animals that do not acquire a lasting immunity and such may later succumb to cholera; whereas if serum and virus are given in the usual way, or better with a 50 per cent overdosage of serum, a lasting immunity is conferred upon the animals that survive, which ordinarily is upwards of 70 per cent, even in badly infected herds.

In a discussion of this subject, Dr. A. T. Kinsley, Kansas City, pointed out that in the vaccination of swine, the animal was more important than either serum or virus or the operator, and should receive first consideration. He also stated that the findings of Doctor McBryde coincided with his own experi-

ence, which is, that there is no advantage to withholding virus when vaccinating infected herds, but that on the other hand, there are a number of advantages in giving both serum and virus to such herds. He emphasized also that immunity to hog cholera resulting from the injection of serum and virus is a relative condition and that in perhaps 2 per cent of properly vaccinated animals, this immunity can be broken down. He stated that there are three principal causes of losses in swine following vaccination, one, necrotic enteritis; two, a streptococcic enteritis, and three, erysipelas. Also, that losses resulted less frequently from hemorrhagic septicemia, flu, edema of the lungs and intestinal parasites.

Vulvovaginitis in Gilts, by S. H. McNutt, Iowa State College, Ames, Iowa.

Dr. McNutt stated that this condition was first observed in the early summer of 1927; that it occurred in South Dakota, Minnesota, Iowa, Illinois and Indiana. That in Iowa, the district in which the trouble occurred was separated from the district in which it did not occur by a sharp line of demarkation, the affected district being the Northeast and North central parts of the state.

The vulva is the primary and most important seat of the lesion of vulvovaginitis. Swine are particularly free from bacterial infection and no specific or sporadic infection of the vagina of sows is recognized. Vulvovaginitis occurs most frequently in young gilts from six weeks of age up to 150 pounds in weight. Old sows are but slightly affected. In herds where there was much vulvovaginitis, the prepuce of boars was sometimes affected; but it was by no means certain that the condition bore any relation to vulvovaginitis.

The inflammation starts in the vulva and extends to the vagina, often causing a prolapse six inches in length and four inches in diameter. In 5 per cent to 10 per cent of the cases, there is a prolapse of the rectum. The prolapse of the vagina occurs in about 30 per cent of the cases. The other genito-urinary organs and all other organs of the body are normal. Death, when it occurs, is due to injury of the prolapsed parts and secondary causes.

A careful investigation was made of the cause of vulvovaginitis in the outbreak of 1927. The disease was not transmissible by contact or inoculation, nor could any bacterial organisms be found that appeared to be responsible for it. Toxic plants were likewise ruled out as causative factors. There was but one feed that was common to all herds affected, and that was corn. The summer of 1927 was unusually cool and wet, and 60 per cent of the corn in the region in Iowa affected by vulvovaginitis was immature. Many feeding trials appeared to demonstrate conclusively that the causative factor was some toxic material in the corn. No specific mold could be implicated though of course, all spoiled corn is moldy.

Some Common Diseases of Sheep, by W. L. Boyd, University of Minnesota, St. Paul, Minn.

Sheep are regarded by veterinarians as being relatively free from diseases of bacterial origin, but great sufferers from parasites. The stomach worm is the most important and destructive parasite of sheep and Doctor Boyd advises that whenever the sheep in a herd are not doing well, that the veterinarians think first of stomach worms. Stomach worms like most other parasites, are most harmful to the young, and heavy losses in lambs occur in August, September and October. Prominent symptoms are diarrhea, loss of weight, anemia, edema of the lower jaw and dry, harsh white skin. There is frequently a disturbance of the appetite and the lambs are prone to eat dirt.

The author has found that both medication and pasture rotation are necessary to control stomach worms. He was not successful in controlling it by either means alone. Pure drinking water is essential, particularly for sheep having

access to low swampy grounds; otherwise they will drink swamp water and spend their time in low ground and this favors a heavy infestation with stomach worms. Good feeding is a further essential for infected sheep. Sheep do not do well in cut over lands, unless they have supplemental feed.

Many sheep in northern Minnesota suffer from lung worms and almost all of them have nodular disease. Neither is usually fatal.

Medication of sheep must be carefully performed. There have been large losses from improper drenching. Drenching should be done only by a veterinarian. A one per cent copper sulphate solution is the best medication for internal parasites whether stomach worms or intestinal worms.

Goitre is very common in sheep in Minnesota, particularly in northern Minnesota; woolless lambs are frequently born. It is, of course, due to an iodin deficiency and potassium or sodium iodid fed the ewe in water or salt during pregnancy is an efficient preventive. The losses in some districts from goitre are very heavy.

Acidosis, stercoremia, preparturient eclampsia, paralysis of pregnancy, etc., is a destructive ailment of sheep. It usually affects old ewes and the cause is a high protein diet and insufficient exercise. The symptoms are disturbed vision; paralysis; salivation; grinding the teeth; hurried respiration. It occurs late in pregnancy and seldom or never in ewes carrying a single lamb. Mortality is high. Pregnant ewes must have two or three miles exercise daily and in bad weather, they will not take this exercise unless compelled to do so either by driving or taking the feed to a distance forcing the animals to walk to the feed and back.

The best treatment for the condition is full doses of magnesium sulphate or oil. Treatment is not very successful. Fat ewes are far more prone to the ailment than thin ewes, and old animals are more prone to the ailment than young.

Among the digestive disturbances of sheep, acute tynpany is the most common. It is due to the same causes that produce it in cattle, that is feeding on succulent growths, particularly dewy legumes. The treatment is the same as for cattle.

Sheep seldom pick up foreign bodies and do not suffer from this ailment in anything like the degree that cattle do.

Among the skin diseases, other than those of parasitic origin, trifoliosis is the commonest. The lesions show about the lips. The condition is common also in cattle, particularly in white-skinned animals.

Urinary calculi are common in rams and weathers.

Castration and docking of lambs is a real veterinary problem. A great many lambs are marketed without these operations and at a very considerable loss. The emasculator is an efficient instrument for docking lambs and the emasculatome is recommended for castration.

Dystocia occurs in sheep but not so frequently as one would expect, considering the number of twin and triplet lambs. Twins are not a cause of dystocia in sheep as they are in cattle. In the larger breeds, the veterinarian can do much for dystocia by manual manipulation. In the smaller breeds, of course, this is not ordinarily the case.

Retained fetal membranes is not common in sheep, but when it occurs, it is frequently fatal. The ewe is not nearly so tolerant of metritis as is the cow.

Abortion disease occurs but rarely in sheep in Minnesota.

Prolapse of the cervix in late pregnancy is common and very obstinate. Treatment is usually unsuccessful.

There is considerable loss in lambs from entropion. The condition is readily amenable to treatment. Because of the wrinkled skin of the parts, it is necessary to remove a large eliptical piece.

Joint-ill is common in lambs in some districts. The treatment is similar to

that for navel ill in colts.

Prevention and Control of Sheep Parasites in Pennsylvania Flocks, by Henry W. Turner and Joseph G. Moon, Pennsylvania Bureau of Animal Industry, Harrisburg, Pa.

The Pennsylvania Bureau of Animal Industry made a survey in 1920 to ascertain the prevalence of parasitic diseases in sheep. The loss was discovered to be very large, particularly in the low lands. In 1925, experiments were undertaken to determine the best means of control of parasitic diseases of sheep. Results of the experiments indicate that stomach worms and intestinal parasites cannot be controlled by the administration of anthelmintics. It was ascertained that fecal examination is a good indication of the presence and degree of parasitism.

Diseases of Range Sheep, by E. T. Baker, Moscow, Idaho.

As causes of loss of sheep on the range, predatory animals and poisonous plants rank at the head of the list; next in importance, are parasites and inclement weather. Acidosis or stercoremia probably ranks next on the high lands. Other important causes in the loss of sheep are: 1, foot rot (both lip and leg ulceration and canker); 2, still-born lambs; 3, maggots; 4, ticks; 5, dystocia; 6, big head; 7, goitre; 8, tetanus; 9, blackleg; 10, rabies; 11, hemorrhagic septicemia; 12, pseudo-tuberculosis.

Dr. W. B. Lincoln, state veterinarian of Tennessee, in discussing sheep diseases, stated that in his state they found the emasculatome the best instrument for both docking and castration. The docking should be done at three or four days of age, and the tail left to drop off of its own accord, the essential thing being to make no open wound. In his state, particularly in the low land, sheep suffer much from stomach worms. They have been able to entirely control the condition by the use of copper sulphate every four weeks from frost to frost. Rotation in this district of Tennessee is impractical, and the use of blue stone has shown it to be unnecessary.

His experience in acidosis or paralysis of pregnancy was the same as that of Doctor Boyd and Doctor Baker. He had never found a case of it in a ewe carrying a single lamb. In ewes carrying twin lambs, it is very prevalent.

Discussing the paper further, Doctor Boyd stated that tape worms in sheep are very common in Minnesota, but seldom harmful. However, in North Dakota and in the range country, the fringe tape worm in sheep is quite destructive. This tape worm never occurs in native Minnesota sheep.

Dr. T. H. Ferguson recommended the use of the stomach tube instead of drenching, stating that it is entirely safe, more rapid than drenching and more professional. He is able to drench 100 lambs an hour with copper sulphate solution.

Discussing foreign body cases in bovines, Doctor Ferguson stated that he operated on a good many of these cases. That for traumatic pericarditis he had operated by making the incision just at the ensiform cartilage or by the removal of the eighth rib; and that there is little choice between the two operations. He reported one case that in the beginning of the attack, appeared to be simple indigestion and he was not called for a week. On seeing the case, he diagnosed it as traumatic pericarditis and performed a rumenotomy, locating and removing a piece of wire which extended eight inches forward from the reticulum. There was considerable improvement, but 12 days later, he again operated on the case, opening the chest at the end of the ensiform cartilage and evacuated 1½ gallons of pus from the pericardial sac. At this time he palpated the heart carefully and could find nothing wrong with it. He inserted a drainage tube and again for a time there was considerable improvement in the animal's condition. Two weeks later the cow died. An autopsy revealed the cause of death to be rupture of the posterior vena cava, due to a long piece of wire that had passed back into the vein. This wire was sim-

ilar to the piece first removed and presumably broken from it.

Another case he was called to see was diagnosed as pericarditis and a resection of the eighth rib made. A pail of pus was removed from the heart sac, but although the heart was carefully examined, no foreign body could be found. The drainage tube was put in place and the animal made a rapid and complete recovery. He regards the operation as a good one and in many cases one that will salvage the animal for the owner.

Returning the Uterus, by E. E. Bittles, Waterford, Pa.

Doctor Bittles stated that as a result of 40 years experience he had adopted a method for this operation that he found very satisfactory. He stated that when called to see an animal with everted uterus, a veterinarian would usually find her lying down and it was best to permit her a recumbent position until he was entirely ready for the operation. As quietly as possible, he gets everything ready; puts on overalls and rubber boots, and has prepared two pails of warm water to which he adds 1½ ounces of creolin to the gallon. He also prepares a needle and sutures, and when all is ready, jumps the cow up as suddenly as possible. He then proceeds to pour one pail of the creolin solution over the inverted uterus and picks off bits of straw and trash, but does not rub or manipulate the organ, regarding this as injurious. He exhibited an instrument about 30 inches long that he had made to assist in returning the uterus. The instrument consisted of a ⅜ inch nickle plated rod with pear shaped wooden blocks on each end; the block on the larger end which he uses for cows being three inches in diameter; at the smaller end, which he uses for ewes and sows, 1½ inches in diameter. The uterus is returned by finding an inverted horn and after starting it into position with his hands, placing the block against it with the other end against his chest and both hands free for manipulation. It is usually a comparatively simple matter to return the organ. Then, with one hand in the uterus and the instrument manipulated with the other hand, he was careful to completely replace both horns, and to smooth out the uterus into proper position. Where this was done carefully, straining rarely follows. Nevertheless, he always sutures the vulva as an additional precaution.

Dr. R. R. Dykstra stated that he had found epidural (Benesch) anesthesia a very great assistance in returning the uterus and an efficient preventive of any straining afterwards, and asked Doctor Bittles if he used it. Doctor Bittles stated that he had not seen any need for it.

The Breeding Efficiency of a Herd Negative to the Agglutination Test for Abortion, by Herbert Lothe, Waukesha, Wisconsin.

Doctor Lothe detailed five years experience in handling infectious abortion in a herd varying from 136 to 180 head of cows. This herd had been wholly free from abortion until 1923, when following the purchase of a number of new animals, the disease broke out in rather severe form. An agglutination test was made and 21 animals reacted. These were isolated and kept in a separate barn and handled by separate attendants, and permitted no contact with the rest of the herd.

A second agglutination test of the main herd was not made for ten months, when 18 animals reacted. Following this, tests were made at three month intervals, and there were 1 to 10 reactors to each test until the middle of 1927, since which time the clean herd has remained free from reactors.

However, the breeding efficiency of the clean herd remained unsatisfactory. 53 per cent of the reacting herd freshened pathologically; 20 per cent of the non-reacting herd freshened pathologically. The breeding efficiency of the reactors was 47.2 per cent in the beginning and 32 per cent at the close of the five year period. The breeding efficiency of the non-reactors was 62.5 per cent at the be-

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ginning of the five year period and 63 per cent at the close. However, for some years during the period the breeding efficiency of the two herds was approximately even. 30 per cent of the reacting cows aborted and 13 per cent of the non-reactors aborted. No *Br. abortus* could be found in the aborted fetuses of the non-reactors. This germ was demonstrated in all aborted fetuses of the reactors.

After much investigation, most of the sterility and all of the abortion in the non-reacting herd was traced to the sire used. Coincident with the outbreak of infectious abortion in this herd, a new sire had been obtained and used on a part of the cows. After two years, when it was demonstrated that he was a poor breeder, another sire was obtained and he proved to be no better. In the meantime, the original herd bull which was still being used had become a poor breeder. All three bulls were at all times negative to the agglutination test for contagious abortion and the experience seems conclusive that the new bull first obtained was suffering from an infection or other condition that made him a poor breeder and that this was communicated to the second new bull obtained and also to the original head of the herd. Had not unusually careful records been kept, it is probable that the inefficiency of the sires who were apparently directly responsible for a large percentage of the abortions would not have been discovered and the whole trouble would have been laid to the Bang bacillus. The trouble with the bulls was not ascertained. They remained negative to examination, both clinical and microscopic, except that the new bull first introduced suffered from a persistent and recurrent ballanitis.

Dr. J. W. Connaway, discussing the paper, stated that it was one of the best on the subject he had ever heard. Good because it gave fairly both sides of a question that has been the subject of much controversy among veterinarians. Without the careful record kept by Doctor Lothe and the frequent examinations that he made, we could have but concluded that the agglutination test and the segregation of reacting animals had failed to control infectious abortion in this herd; whereas it had not failed to control abortion due to the Bang bacillus, but only that due to the breeding inefficiency of the bull, something which of course it was not designed to control. He stated that the tendency now is to keep bulls longer than was formerly done, particularly bulls that had sired high producing cows, and that because of this the breeding efficiency of the bull had become a far more uncertain factor than heretofore, and that veterinarians treating herds for infectious abortion or other conditions resulting in low breeding efficiency must now give careful attention to the bull.

The Rejuvenation of Bulls, by T. A. Sigler, Greencastle, Indiana.

Doctor Sigler related a number of cases in which he had performed the Steinach operation on bulls. He stated it as his opinion that it offered a practical means of "pepping up" old bulls that had become sexually indifferent, and should be the means of getting one or two more years of service out of such animals that otherwise were useless for breeding.

The operation is very simple, easily performed (ligation of the vas defferens of one testicle under complete asepsis) and he believes valuable.

Poultry Problems in a General Practice, with Special Reference to Coccidiosis, by John Patterson, Hedrick, Iowa.

The essayist doubts that the veterinary profession is doing all or anywhere near all that it can to safeguard the live stock industry in all its branches. He fears that many do not take the interest in safeguarding the poultry industry that its importance demands. He stated that though Iowa is not first among the poultry producing states, that some statistics of the poultry industry in Iowa may impress upon the veterinarians present the importance of this industry and their obligation to safeguard it from disease. In 1926, Iowa produced 15% of the

eggs sent to the four principal markets, Chicago, New York, Philadelphia and Boston, and also 15 per cent of the dressed poultry sold on those markets. In the same year, Iowa shipped 4,000 car loads of dressed poultry out of the state; 1,500 car loads of live poultry; and 10,000 car loads of eggs.

Everyone knows that Iowa stands high in the production of hogs and dairy products. In 1926, the hogs produced in Iowa amounted to $315,000,000 and the dairy products to $130,000,000. No one questions that veterinarians should safeguard such important industries as these, and yet the poultry industry, which produced $73,000,000 worth of products was of more than half the value of the dairy products and worth more than one third as much as all the hogs.

A small percentage of the diseases of poultry in Iowa is handled by veterinarians. Too much is left for the itinerant peddler who never gets into this work except as a result of the indifference of some veterinarian. Doctor Patterson cautioned his hearers to be careful in making a diagnosis in poultry diseases, and under no circumstances to make a diagnosis without holding a postmortem examination.

Mentioning some of the unusual things that may occur and lead a veterinarian astray in his diagnosis, Doctor Patterson related being called to see a flock of chickens that the owner was firmly convinced had been poisoned by his neighbors. It was just after a 4th of July celebration and an autopsy revealed phosphorus in the crop. The trouble was due to bits of "devil chasers" that the chickens had picked up in the grass where children had been firing these off.

In another case, he found young chicks dying with their crops filled with gravel. The trouble was due to spraying the premises with crude oil and allowing it to drip on the gravel. Chicks will eat gravel coated with crude oil.

In another case, there was a large loss of chickens from arsenic poisoning. The trouble was due to drinking from pools of rain water under fruit trees that had been sprayed recently.

Chickens should be raised on new ground each year. The McLean County system for the control of parasites in hogs is even more successful in the rearing of chickens. Its effect in controlling disease and parasitisms is nothing short of marvelous.

Coccidiosis is the cause of much grief to poultrymen. Raising chickens on new ground each year is an effective preventive. Doctor Patterson has found quinin a highly satisfactory treatment for coccidiosis. He has used ½ grain per bird daily in the feed and continued the treatment for a week. Another has reported equally successful results from a smaller dose, a heaping teaspoonful of quinin sulphate to the gallon of drinking water.

Suipestifer infection of swine was first recognized in 1862. In 1885, Salmon and Smith identified the organism. Doctor Murray's experiments have shown that practically 100 per cent of animals fed a suipestifer culture contracted the disease in 5 to 7 days. The injection of the organism both intravenously and subcutaneously is not so successful in producing the disease.

According to the experiments, the bacillus necrophorus is a purely secondary invader in infectious necrotic enteritis. Several investigators have reported the finding of an occasional *B. suipestifer* organism in healthy swine, but this is rare. The presence of the organism in the intestine ordinarily means the presence of the disease. Although carriers of *B. suipestifer* may occur, they have not been identified so far.

The use of bacterins gave some very encouraging results. In one experiment in which 40 pigs were used, 31 were given suipestifer bacterins and 9 were used as controls. 6 of the 40 pigs died, 5 being controls and 1 a vaccinated pig.

200 pigs under field conditions were treated with a killed culture of *B. suipestifer* in 1928 on farms where infectious enteritis had prevailed for two or three years. Five to seven days after the bacterin treatment, the hogs were given serum and virus without loss. It is believed that had these animals not been protected against suipestifer infection by the bacterin treatment, there

would have been considerable, perhaps heavy, losses from infectious necrotic enteritis following the anti-hog cholera vaccination.

A group of pigs were fed a culture of suipestifer and given serum and virus the same day. Practically all died. In only one instance were cholera lesions found.

Studies on Hog Cholera Virus, by H. C. H. Kernkamp, Iowa State College, Ames, Iowa.

This paper consisted of a detailed discussion of a series of experiments devised for the purpose of throwing further light on filtrable virus of hog cholera. The experiments were made at the Iowa State College, at Ames. Forty pigs were used in the experiment and electro-charged filters were employed. Kernkamp concludes that the virus of hog cholera is neutral, since it passes through both electro-positive and electro-negative filters.

Observations on Canine Distemper, by F. W. Wood, The Cutter Laboratories, Berkeley, Calif.

The essayist classes distemper as a specific infectious disease of dogs and ferrets due to a filtrable virus. Some confusion has arisen in previous investigations of this disease because investigators have apparently studied two or more distinct diseases. Ferry and his collaborators studied infectious broncho-pneumonia of dogs, a disease that is frequently mistaken for distemper at the present time. Dogs immune to distemper, that is, the filtrable virus disease, in most instances are susceptible to broncho-pneumonia.

The symptoms of distemper are somewhat variable, but not more so than the symptoms of many other diseases. Four to 10 days after infection, there is a rise in temperature of 1 to 3 degrees above normal. This elevation of temperature lasts 3 to 4 days, following which the temperature drops back to normal and the dog appears well. About 10 days after the first rise, there is a second rise. At this time, there is a watery discharge from the eyes and nose and a conjunctivitis. It is in this stage that the owner ordinarily recognizes the disease and presents the dog to the veterinarian for treatment. The nervous form of distemper occurs in about 10% of the cases. Chorea is an after effect that may or may not be due to the filtrable virus.

Dogs can be immunized against distemper by use of the homologous serum and virus (antigen). Successful immunization depends upon freedom from infection, age and physical condition. The immunity is of variable length; its limits have not been determined. Some small animal practitioners consider it a good plan to give serum alone to young dogs that are hospitalized; at their own expense where the owner is not willing to pay for proper vaccination. This will protect the dog from distemper while he is in the hospital and for some time thereafter, and protect the veterinarian from the charge of having infected the dog while in his care.

Results of Research on the Diseases of Fur Animals in Captivity, by R. G. Green, University of Minnesota, Minneapolis, Minn., and J. E. Shillinger, Bureau of Biological Survey, U. S. Department of Agriculture, Washington, D. C.

The Bureau of Biological Survey of the U. S. Department of Agriculture began the study of fox diseases in 1921. The University of Minnesota undertook the study of the diseases of these animals independently in 1924. In 1927, the work was combined and is now being carried on at the University of Minnesota cooperatively.

The work so far carried on has given investigators a definite insight into two destructive epizootics of foxes, fox paratyphoid from which the industry suffered heavily in 1925, and epizootic encephalitis of foxes which was of widespread prevalence in 1926 and 1927.

The paratyphoid of foxes is primarily a disease of pups and the mortality runs as high as 60 per cent of all the pups born on a ranch where the infection prevails. The incubation period is about 18 days. The principal symptom is a loss of weight.

On autopsy, the respiratory tract is normal, the intestinal tract inflamed, a paratyphoid organism can be recovered from the intestinal tract in pure culture. In the win-

ter, paratyphoid is sometimes accompanied by respiratory involvement which is believed to be due to a secondary invader. There is every evidence that the paratyphoid organism is the primary cause of this disease.

Epizootic encephalitis of foxes is very insidious in its manifestations. It spreads slowly under ranch conditions, affects all ages equally. The mortality rate of an infected ranch is about 15 per cent of the foxes on the ranch. Death occurs very suddenly. Frequently the first thing noted is the finding of dead foxes. The symptoms are those of nervous manifestation, convulsions and lethargic sleep and paralysis. On postmortem examination there are ordinarily no macroscopic lesions other than insignificant hemorrhages. The disease is conveyed by the injection of brain substances. The incubation period is 4 to 7 days. Other animals than the fox appear to be immune to this disease.

In a good many ways encephalitis of foxes resembles dog distemper, but it is not the same disease. Microscopically, the lesions consist of hemorrhages in the central nervous system, particularly in the gray matter of the brain and perivascular infiltration. Doctor Green exhibited several reels of motion pictures showing foxes affected with paratyphoid and epizootic encephalitis and many microscopic slides showing minute hemorrhages and perivascular infiltration of lymphocites in the tissues of the brain and spinal cord.

Fecal Examination for Evidence of Parasitism in Domestic Animals, by E. A. Benbrook, Professor of Veterinary Pathology, Iowa State College, Ames, Iowa.

Laboratory diagnosis is occupying a place of ever increasing importance in veterinary diagnosis, but it should be borne in mind that it is not a substitute for careful clinical observation. There are many advantages to microscopic examination in the diagnosis of parasitisms. In the first place, it is almost the only definite means of diagnosing intestinal parasites, except the tapeworms, in animals, without a postmortem examination, and except in poultry and swine where there is ample material available, a postmortem examination is usually not to be had.

Fortunately for the diagnostitian, practically all intestinal parasites are prolific producers of eggs and the eggs are usually characteristic for species or at least for groups.

Only 5 to 10 minutes are required to make a diagnosis by a microscopic examination of the feces for eggs. Credit for originating the method of examination now used with slight modifications is due to A. Leslie Sheather of London. The essayist showed lantern slides of all of the apparatus required for making the fecal examination for parasite eggs and of each stage of the examination. A fecal examination for parasite eggs is not absolutely perfect as a means of diagnosis. The parasites may not yet have reached the stage of the egg production and again in cases of diarrhea the eggs may be so diluted that they are not readily found. Further, the administration of castor oil or mineral oil may prevent the finding of eggs by floating to the top of the solution and thus prevent the eggs from being picked up.

In the carnivora foreign eggs may be found; that is, eggs acquired from eating the intestinal matter or fecal discharges of other animals and be misleading. The toll of parasites in the live stock industry is a very heavy one, and veterinarians should omit no opportunity for protecting the industry from parasitisms. Fecal examination should be much more widely employed by veterinarians than it is at the present time.

The Danger to Man of Bovine and Avian Tuberculosis, by Charles H. Mayo, Mayo Clinic, Rochester, Minn.

On the evening of the third day of the meeting, Doctor Charles H. Mayo of Rochester addressed an audience that filled the large ballroom of the Nicollet Hotel to its extreme capacity. The doctor assured the veterinarians present that their practice possesses some advantages not enjoyed by the men of his profession, among which he mentioned that no one was attempting to cure animals by prayer or advocating the replacing of the vertebrae in the horse.

He stated that intestinal tuberculosis of

children and glandular tuberculosis of adolescents was now far less common at the Mayo clinic than before the eradication of bovine tuberculosis was undertaken, and before the milk of cities was generally pasteurized.

He stated that the intestinal tuberculosis of children and the glandular tuberculosis of adolescents that reach the Clinic now came almost entirely from farms, because of the efficiency of milk pasteurization in the cities, and with the completion of the tuberculosis eradication project he expected to see this largely disappear from country-bred children.

He mentioned that 30 years ago 203 out of each 100,000 people died of tuberculosis yearly; now but 95 of each 100,000 population die of this disease yearly. Doctor Mayo dealt at length with the many researches and incontestable proof that a large percentage of all tuberculosis of children, other than pulmonary, was due to the bovine tubercule bacillus and contracted principally from consuming raw milk from tuberculous cows.

Researches on Bacillus Calmette-Guerin (B. C. G.): Experimental Vaccination Against Bovine Tuberculosis, by E. A. Watson, Chief Pathologist, Department of Agriculture, Ottawa, Canada.

By growing a strain of the tubercle bacillus on a bile medium for a period of 16 years, research workers at the Pasteur Institute produced a strain of tuberculous organisms that the investigators, Calmette and Guerin, state to be nonvirulent, but capable when inoculated into a nontuberculous animal of giving it a positive immunity to ordinary tuberculous organisms. This nonvirulent strain of tubercle organism is referred to as B. C. G. Claims of the French savants were discussed in the April, 1928, issue of VETERINARY MEDICINE, pages 185-186.

For more than a generation someone has come forward almost yearly with what has been heralded as almost an infallible cure for tuberculosis. The scientific world has long been skeptical of cures or preventives for this disease, and for a good many years have paid very little attention to the originators of such cures or preventives, but when five years ago Calmette and Guerin announced from the Pasteur Laboratory that they had produced a strain of the tuberculosis germ entirely innocuous, and had been able to confer an immunity to the virulent organism by its use, the high standing of Calmette and Guerin in the scientific world and the great prestige of the Pasteur Institute commanded instant attention and, though from that time to this their findings have not been confirmed by any other investigator, such confidence was placed in their statement that between 80,000 and 100,000 children in France and French possessions have been given this vaccination and it has been given to many thousands of calves.

Because of the great importance of tuberculosis both to the livestock industry and to public health, and if successful the economy with which the disease can be controlled by the use of the Calmette-Guerin bacillus, which for convenience is referred to as B. C. G., it seemed highly important that the findings of the originators of the tuberculous vaccine be confirmed, and the value of the vaccine be demonstrated at the earliest possible moment, or, if the findings of Calmette could not be confirmed and the value of the vaccine cannot be demonstrated, that this be ascertained.

Doctor Watson's experiments with B. C. G., the first adverse results on it to be published, was conducted with great care and a very considerable number of guinea pigs were used. The first question he undertook to settle was as to the innocuousness of B. C. G. Guinea pigs were inoculated with organisms obtained directly from the Pasteur Institute. Ninety-four that died or were killed within a five-month period after inoculation, showed no lesions of tuberculosis on the most careful examination, but of guinea pigs that were allowed to live a longer period, 280 to 400 days, a considerable number showed lesions of tuberculosis and 9 a virulent infection that could be transferred to other animals as readily as the ordinary tuberculous infection.

Doctor Watson is therefore compelled to deny that B. C. G. is harmless and asserts, on the contrary, at least for guinea pigs, it is sometimes infectious and may produce fatal tuberculosis.

Another test was undertaken to determine whether or not inoculation with B. C. G. would produce immunity in calves to the natural infection. Calves from tuberculosis free cows in an accredited herd were cared for so that there could be no possibility of tuberculosis infection until they were seven days of age, and then inoculated with B. C. G. Subsequently, they were fed milk from tuberculous cows with the result that after periods of something more than 200 days all were infected with tuberculosis, and on the score of its protection against tuberculosis Doctor Watson has therefore concluded that it is not an effective preventive.

Since this test was undertaken Calmette has modified his original directions to require that calves be protected from tuberculosis infection for a period of 30 days after inoculation with B. C. G. This is a reasonable requirement, since it allows some time for immunity to be established, but at the same time it would in a measure lessen the value of the vaccine, since on a tuberculosis infested farm it might not always be easy to protect the calves for this period from possible infection.

Doctor Watson has a new test under way to determine if the vaccine is any more protective under these conditions than under the conditions first announced. The findings of Doctor Watson are, of course, a great disappointment to him and to everyone else interested in the control of tuberculosis, but they were not unexpected by many scientific men.

No explanation was offered for the divergence in the findings of the essayist and the originators of B. C. G. Doctor Watson concludes that: "B. C. G. is in the experimental stage. Its innocuity and efficiency is open to question."

Committee Reports

Representative on Board of Managers, Horse Association of America, by H. R. Church, Chairman, Harrisburg, Pa.

This report discussed mainly the success that has been attained in an attempt to popularize the big hitch. 210 pulling contests were held in 16 states. 1800 teams competed. There are now 14,000,000 horses on the farms, a decrease of 4 per cent in a year. The number is now the lowest it has been in forty years. There is a serious shortage of good horses and mules. The equine birth rate is only two-thirds the death rate.

Committee on Necrology, by A. H. Baker, Chairman, Chicago, Ill.

This report was read by Secretary Hoskins, Doctor Baker being absent because Mrs. Baker was injured in a fall (fractured humerus) just a few days before the meeting, which they had made every preparation to attend.

The report recorded the loss of one honorary member (E. T. Meredith) and 37 regular members.

Committee on Legislation, by John P. Turner, Chairman, Washington, D. C.

This committee was able to make the most gratifying report that it has made since the enactment of the Army Veterinary Bill of June, 1916. As a result of the passage of the Welch bill, increasing the salaries of certain professional employes in the classified service and of the veterinary bill, which further increases the salaries of Bureau of Animal Industry veterinarians in the lower brackets, more than 700 of the 1300 veterinary employes of the B. A. I. will now receive $2800 a year or more. The entrance salary for junior veterinarians (the lowest grade) in the B. A. I. is now $2000 a year. The increases in salary for those now in the B. A. I service are as follows:

Old Rate		New Rate
$1860	increased to	$2200
$2000	increased to	$2200
$2100	increased to	$2400
$2400	increased to	$2800
$2500	increased to	$2800
$2600	increased to	$2900
$3000	increased to	$3300
$3100	increased to	$3400
$3200	increased to	$3500

$3300 increased to $3500
$3400 increased to $3600
$3500 increased to $3700
$3800 increased to $4600
$4000 increased to $4600
$4200 increased to $4800
$5200 increased to $5600
$5600 increased to $6000

The salary for the assistant chief of the bureau was increased from $5200 to a rate of $6500 to $7500, depending upon the length of service, and the salary for the chief of the bureau increased from $7500 to a rate of $8000 to $9000, depending on the length of service.

The provisions of the veterinary bill are restricted to veterinarians in the field service of the B. A. I., and in the junior, assistant and associate grades; that is, receiving a salary of less than $3800 a year. The Welch bill affects all professional grades in the federal service.

Committee on Veterinary Biologics, by F. A. Imler, Chairman, Kansas City, Kansas.

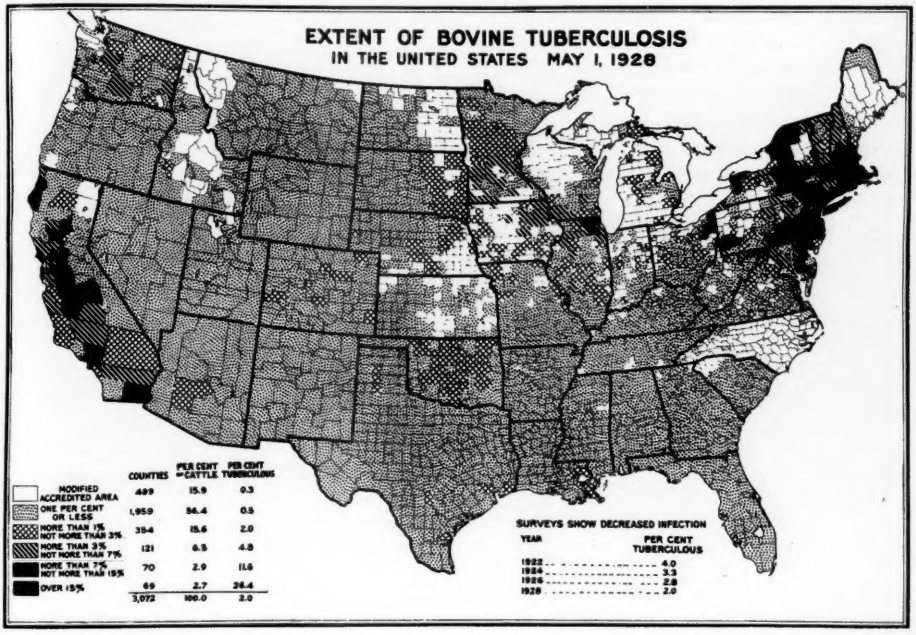
This committee reports that there are now on the market 71 authorized veterinary biologics marketed under 267 different names.

Special Committee on Schmidt Memorial, by W. J. Embree, Chairman, Chicago, Ill.

This committee reported that it had completed its work and a memorial to Doctor Schmidt had been installed and unveiled in the Royal Veterinary College of Denmark, at Copenhagen.

Committee on Tuberculosis, by C. E. Cotton, Chairman, St. Paul, Minn.

This committee report first paid tributes to the late Doctors Kiernan and Schroeder, both of whom had a large part in tuberculosis eradication in this country.


EXTENT OF BOVINE TUBERCULOSIS
IN THE UNITED STATES MAY 1, 1928
COUNTIES
PER CENT OF CATTLE
PER CENT TUBERCULOUS
MODIFIED ACCREDITED AREA 499 15.9 0.3
ONE PER CENT OR LESS 1,959 56.4 0.5
MORE THAN 1% NOT MORE THAN 3% 354 15.6 2.0
MORE THAN 3% NOT MORE THAN 7% 121 6.5 4.8
MORE THAN 7% NOT MORE THAN 15% 70 2.9 11.6
OVER 15% 69 2.7 26.4
3,072 100.0 2.0
SURVEYS SHOW DECREASED INFECTION
YEAR
PER CENT TUBERCULOUS
1922 4.0
1924 3.3
1926 2.8
1928 2.0

Satisfactory progress is being made in the United States and Canada in the eradication of bovine tuberculosis. Over a million herds, containing more than 10,000,000 cattle, were tested during the past year. 527 counties are accredited free areas; 129 of these counties were accredited last year. Altogether, 1119 counties are accredited or in the process of accreditation.

Avian tuberculosis was given more attention during the past year than ever before.

When bovine tuberculosis eradication was undertaken, it brought prophesies of milk famine and high prices. Although more than 1,500,000 tuberculin reactors have been slaughtered since the work began, the consumption of milk has increased more than 30 per cent, and this without an increase in price. The area plan of tuberculosis eradication is shown to be the most efficient and the most economical. There is a growing demand for the work.

As eradication progresses, the percentage of non-visible lesion reactors increases, the average being now about 7 per cent, but varying from zero to several times this percentage. Non-visible lesion reactors are not an illogical result of tuberculin testing when it is remembered that reaction indicates infection and not disease. It should further be remembered that the aim of tuberculosis eradication is to destroy infection and not disease.

B. C. G. cannot be considered in this country as a matter for other than careful study and experiment. The committee believes that the detection and elimination of sources of infection should continue to be our aim.

Ninety-five per cent of the livestock owners in tested areas approved the plan of eradication followed. The committee recommends the approval of the uniform rules and regulations for the eradication of tuberculosis and the amendment of the rules to more carefully safeguard clean areas.

Committee on Abortion, by F. B. Hadley, Chairman, Madison, Wis.

The committee believes that the only successful method for the control and eradication of infectious abortion in cattle is founded upon the blood test. A weakness of the agglutination test is that it does not disclose animals in the incubation stage of the disease, and, therefore, ordinarily more than one test is required to ascertain all of the affected animals in a herd.

Since other causes than the Bang bacillus produces abortion, the committee recommends the dropping of the term "abortion free herds" for those free from Bang bacillus infection.

Special Committee on International Veterinary Congress, by John R. Mohler, Chairman, Washington, D. C.

This report was given by Adolph Eichhorn during a temporary absence of Doctor Mohler. Doctor Eichhorn reviewed the history of the latest International Veterinary Congress, which was held in London in 1914 and adjourned after the first day's session because of the outbreak of the World War.

The permanent committee of the International Veterinary Congress convened in Paris in May of this year, and decided to hold the next Congress the latter part of July or early in August, 1930. Doctor Eichhorn recommended that an American committee be formed immediately to continue until the close of the Congress in 1930. He recommended that if the requisite official recognition can be obtained from Washington that an official party be organized to attend the next International Veterinary Congress and to make a tour of Europe, the committee to be under the auspices of the A. V. M. A.

Special Committee on Humane Society Hospitals, by R. S. MacKellar, Chairman, New York, N. Y.

This committee reported that they had held several meetings with representatives of humane societies and had reached an entirely harmonious understanding. The committee is now drawing up a code of ethics to be observed by hospitals maintained by humane societies and for veterinarians in their dealings with these hospitals. The code will be submitted to a joint meeting of representatives of the humane association and the committee, to be held soon, and when adopted the committee is hopeful that it will remove all cause for complaint that veterinarians practicing in certain large cities have made because of the activities of veterinary hospitals maintained by humane associations.

Special Committee on Standard Milk Control Code, by George W. Grim, Chairman, Ardmore, Pa.

This committee reported that it has had the matter of the standard milk ordinance recommended by the U. S. Public Health Service up with the Surgeon General and other officials of the Public Health Service, and that an entirely amicable agreement as-

signing to veterinarians their proper place in all measures for control of milk, hygiene and sanitation is confidently expected.

Committee on Intelligence and Education, by D. H. Udall, Chairman, Ithaca, N. Y.

In Doctor Udall's absence, this report was read by Secretary Hoskins.

In the matter of change of name for the veterinary profession referred to this committee by the association at the Philadelphia meeting, it is recommended that no change be made.

On the list of accredited veterinary colleges, the committee recommended that the following be included:

Alabama Polytechnic Institute, Veterinary Division.

Colorado Agricultural College, Veterinary Division.

University of Georgia, Veterinary Division.

Iowa State College, Veterinary Division.

Kansas State Agricultural College, Veterinary Division.

Michigan Agricultural College, Veterinary Division.

University of Montreal, Veterinary Department.

New York State Veterinary College at Cornell University.

Ohio State University, Veterinary Division.

Ontario Veterinary College.

University of Pennsylvania, School of Veterinary Medicine.

Texas Agricultural & Mechanical College, Veterinary Division.

Washington State College, Veterinary Division.

The Budget Committee recommended appropriations for the ensuing year to the amount of $12,250 for operating expenses and Committee activities.

VETERINARY RESERVE OFFICERS

Veterinary Reserve Officers on active duty at Camp Fort Snelling, Minnesota, July 2nd to 15th.

BACK ROW, reading left to right: Capt. W. L. Williamson, Lt. A. J. Matter, Maj. G. E. Bartholomees, Capt. Fitzgerald, U. S. A., Lt. Col. L. R. Smith, Lt. B. W. Conrad, Capt. R. A. Moye, Lt. L. E. Dietrich, Capt. E. F. Kallenberg, Maj. F. J. Younglove, Capt. A. C. Barr.

MIDDLE ROW, reading left to right: Lt. G. W. Picht, Lt. D. H. Bibens, Capt. G. C. Bevan, Lt. W. G. Lashbrook, Lt. J. H. Kitzhofer, Lt. G. S. Weaver, Lt. L. O. Fish, Lt. E. N. Davis.

FRONT ROW, reading left to right: Capt. F. B. Jones, Lt. F. A. Bonstetter, Lt. J. A. Patton, Lt. E. M. Brady, Lt. B. L. Caudill, Lt. M. L. Dietrich, Capt. H. W. Tornow, Capt. L. E. Willey, Capt. P. L. Ellis.

Paratuberculosis (Johne's Disease)*

By B. A. BEACH, Madison, Wis.

JOHNE'S disease is an afebrile chronic enteritis principally of cattle, caused by a member of the acid-fast group, one of the myobacteria. It goes under a variety of names:—paratuberculosis, chronic enteritis, chronic bacterial enteritis, etc.

History.—In 1896 Johne, a German veterinarian, and Frothingham, an American student working with him, discovered the specific organism in infected tissue. At that time they thought the disease was avian tuberculosis. It was not until eleven years later that Dr. B. Bang showed that such was not the case. The first Johne's disease reported in this country was by the late Leonard Pearson in 1908 near Philadelphia. In 1910 Twort and Ingram of England were successful in growing the organism in pure culture, since which time the only real progress in combatting this disease has been made.

Occurrence.—How important is this disease from an economic standpoint? It is not exceedingly prevalent at the present time. An estimate of the monetary losses is difficult to make. It is many times not recognized for a number of years after it has been introduced in a herd. The economic losses are, therefore, greater than some of us probably suspect. A noted eastern veterinarian is responsible for the statement that unless something is done to check the spread of this disease it may be as serious a menace for the next generation as is tuberculosis for the present one. However, that may be, I do not know. It has, however, been the practice to get excited about a disease after its ravages have been considerable. It would seem advisable to check the spread of this disease, if that is possible, and it is possible if we take advantage of the meagre knowledge that is at our command at the present time.

We don't know anywhere near as much about Johne's disease as we should. There are a good many points yet to be cleared up. This happens to be an exceedingly difficult and expensive disease to investigate. Our knowledge comes slowly for several reasons. One is the very chronic and insidious nature of the disease. Its progress is exceedingly slow. Another reason is the organism that causes the disease grows very slowly and its growth at all times is attended with considerable difficulty. We can grow the organism, but not nearly as readily as we wish we could. The cause of Johne's disease is known as Johne's bacillus. It belongs to the same group of organisms as tuberculosis, leprosy, and a variety of other diseases.

The presence of Johne's disease in any herd is a serious handicap to the development of that herd. In fact, there are some herds that have gone out of business because of this disease. Johne's bacillus approaches a perfect parasite. The damage to the host is not marked. The organism allows the host to live for months and sometimes years before death ensues.

Symptoms.—The symptoms exhibited by animals suffering from this disease are: first, a loss of flesh, a slowly progressing emaciation, diarrhea is sometimes present, usually intermittent in character. However, a diarrhea is not always present. We have observed animals that have become infected and died from the disease where a diarrhea, as far as we could determine, never occurred. Emaciation and diarrhea are the two most pronounced symptoms. Milk flow, of course, is reduced and finally entirely suppressed. The hair coat becomes rough, the eye remains bright and the appetite good to the last. As far as we are aware a rise in temperature has never been noted.

This is a disease essentially of young cattle. Heifers and young cows, following their first or second calves, are more apt to show clinical manifestations of the disease. This is not invariably so, but usually is.

* Address at the annual meeting of the Iowa Veterinary Medical Association, Des Moines, Jan. 17-19, 1928.

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Incubation Period.—This may vary from a few months to as long as five years. We make that five year statement on the basis of some personal observations. It is not possible to always tell just when infection takes place. A case in point is this: A Wisconsin breeder purchased from another state a six-months-old heifer calf. When that animal was six years old she exhibited for the first time symptoms of Johne's disease, the first to appear in that herd, and I personally made a trip to that farm to determine, if possible whether there was any other possible source of infection, and we could determine none. The evidence is pretty clear, although we will admit it is not absolutely certain that this Guernsey cow became infected before she came to that man's farm. An investigation of the farm from which this animal was purchased revealed the presence of Johne's disease, and the history further revealed that the disease had existed in the herd for a number of years. A disease with an incubation period five years in length makes eradication from a dairy herd exceedingly difficult. We have any number of observations where the incubation period was two to three years in duration. I believe we have one other of four years, but the one five and a half year period is the longest one that we have ever come across.

By incubation period we mean the length of time that elapses between infection and the manifestation of clinical symptoms of the disease.

Pathology.—First we will take up the post mortem findings. The lesions exhibited in Johne's disease are very meagre, when one considers the state of emaciation to which the animal is reduced. We are convinced that the disease symptoms and lesions are caused by a poison, or toxin. We believe the disease to be a toxemia. The only lesions ever found, as far as we are able to determine, are in the digestive tract, and the adjacent lymph glands. The only thing that you will be able to see or have been able to see in cases that you have observed, is a thickening of the intestinal wall, usually for two or three feet along the small intestine. There are cases on record where the entire digestive tract was more or less affected. These cases, however, are rare.

No Lesion Cases.—We have observed cases where the animals were dead or about to die from Johne's disease, in which there were very meagre lesions evident to the naked eye, that is, there wasn't very much thickening that we could be sure of. We couldn't make up our minds whether any thickening actually existed and the lymph gland didn't exhibit much. They never do. We have observed a sort of fibrous thickening of the lymph glands; at other times the lymph glands may be swollen and a little firm to the touch. The disease is seldom recognized in the packing houses. I believe the federal regulations do not require examination for Johne's disease. We have corresponded with a few inspectors, however, that have observed the disease in the packing houses.

Prognosis. — The prognosis is grave. Whether animals ever recover from the disease we do not know; we are not certain that they don't, but usually they do not.

Mode of Infection.—How is this disease spread from animal to animal and from herd to herd? Probably always by way of the digestive tract, that is, from contaminated feed and water. As to how the organisms are eliminated from the body is a question that has never been settled definitely. It would seem, however, that there was only one way, and that is that the organisms are given off from the mucous membrane of infected cattle and passed out in the feces. The spread of the disease in any herd is not rapid. It is not as rapid by a good many times as tuberculosis, not nearly as rapid. A large percentage of infected cattle, however, are spreaders.

If you go into a tuberculous herd and select an animal at random and put it into a susceptible herd, you may or may not select a spreader. The tuberculous animal may remain in a free herd for years and never become a spreader. To the best of our knowledge, such is not the case with Johne's disease. A large percentage of them are spreaders. You would almost surely be able to transmit the disease by selecting an animal

at random that was infected with Johne's disease and placing it in a susceptible herd. It gets its seriousness from the fact that most all infected cattle are spreaders; they may not be spreaders for a time after they become infected, probably are not. How long a time that is, I am unable to say.

The Johnin Test.—Dr. Bang of Copenhagen has done a great deal of work with Johne's disease. Avian tuberculin has been used for the detection of this disease. It has been estimated that 60% of the cattle infected with Johne's disease will react to avian tuberculin. Dr. Bang, however, is responsible for the statement that at least in his experience he could not eradicate Johne's disease from the herds with which he worked, by means of avian tuberculin.

The use of avian tuberculin in the field is attended with some danger. A. F. Schalk of the North Dakota experiment station has shown rather conclusively, we think that cattle become readily infected with avian tuberculosis. They will react and the reactions are very pronounced in a good many instances. They do not, however, show lesions on postmortem examination or at least they rarely do. The difficulty we might get into if we used avian tuberculin in the field is therefore apparent. I don't know how prevalent tuberculosis is among farm poultry in Iowa; I do know it is prevalent in Wisconsin. If we used avian tuberculin in the field in Wisconsin, we probably would condemn a large number of cattle that are infected with avian tuberculosis and we believe needlessly so, because Doctor Schalk has shown that those cattle will cease to react after a few months. They throw off the avian tuberculosis infection and cease to react; they do not show lesions. In the present state of our knowledge, what is the use in slaughtering such cattle?

I may say by the way that in Doctor Schalk's work he found without exception that his avian infected cattle did not react to ordinary tuberculin, that is the bovine tuberculin that we all use in the field. I want to emphasize this because some veterinarians somehow have gained the impression that cattle infected with chicken tuberculosis will react to the ordinary tuberculin; they will not, or at least Doctor Schalk could not get them to react in his experimental cattle.

Johnin.—This is a product similar to tuberculin in its manufacture and use. The organism that causes Johne's disease is grown in the same way as the tubercle bacillus is grown for the manufacture of tuberculin. I say in the same way—the same way as near as we are able to grow it, because of the nature of the organism we can't get it to grow at all times, when and where we want it to grow, and when you have to wait five months to a year to make a batch of Johnin, you will appreciate something of the expense and trouble it is to manufacture this product.

Johnin is injected into the blood stream. Every veterinarian should be able and willing to do intravenous work. The efficiency of the Johnin test depends to a large extent on the ability of the operator to deposit Johnin *into* the blood stream and not into the tissues around the vein. Someone is thinking probably, well what about the subcutaneous test? Infected cattle will react at times to the subcutaneous test, but the reactions in our hands have not been consistent. We have not as yet been able to prepare a Johnin that would give consistent results by the intradermal method. We are hoping that someone will be able so to do. It will facilitate the eradication work materially. Valle thinks he has an intradermal Johnin that is efficient. However, that may be, we do not know. Dr. Hagan of the Cornell Veterinary College is also working on an intradermal Johnin and apparently has met with some success. I believe he is not willing as yet to place his product on the market.

Johnin Testing.—I shall describe briefly our method of performing a Johnin test. We go to a suspected herd and take one temperature, one pre-injection temperature. Then we inject our Johnin in the following manner: Place a halter on the animal, especially if it is in a stanchion, and we prefer to have them in stanchions; pull the head upward and to one side; and don't be afraid to pull it up high; place a rope around the neck back of the stanchion and draw it taut until the vein stands out like your two fingers. You can't miss it if you draw it taut

enough, but don't draw it too tight; that will interfere with the animal's breathing and cause struggling. Then with a quick thrust, insert the needle through the skin and the wall of the vein; a stream of blood should shoot out into the manger. Then attach the syringe and inject the Johnin. We use from ten to fifteen cubic centimeters per dose. A reaction is manifested usually between the third and fifth hour.

The rise in temperature compares favorably with the subcutaneous tuberculin test. That is, it is not uncommon to get temperatures between 105° and 106° F. We have had them between 107° and 108° F. The test can be completed within twelve hours, sometimes within ten hours.

There are constitutional reactions also, that is, the first thing you will notice, the animal will commence to shake and quiver, muscular tremors a good deal like a frightened horse; the hair coat becomes rough sometimes, following the injection of Johnin; and there is sometimes observed a profuse diarrhea. That, together with the rise in temperature, constitutes a very definite evidence of the presence of infection.

We have discontinued the use of horse serum in the manufacture of Johnin. We used to use it in order to induce the organism to grow more readily. We have discontinued that because of anaphylactic reactions which were sometimes a source of considerable worry. The first time a herd is tested with a product containing horse serum the anaphylactic reaction is not observed, but if you go back years later you will know about it. We possibly had one fatality on account of it. There is no elevation of the temperature, but it is alarming to the owner and because of that we discontinued the use of horse serum.

Now, as to the relationship of avian tuberculosis and Johne's disease, we didn't use to think there was any; we do not know now definitely that there is. I have just this statement to make. Two of the last four isolations that we made, from cattle that reacted and showed lesions of Johne's disease we recovered organisms similar to avian tuberculosis.

Because of observations based on ten years work with the Johnin test we believe it to be reasonably accurate. From one herd of cattle we got five reactors. We went back the next year and tested the same herd with the same cattle in that herd, got the same five to react and two more, and then the owner was convinced and sold the reactors. In one herd of forty-five head in which there were five reactors, the owner decided to quarantine them. Three of the five later exhibited symptoms of the disease; one of the five was slaughtered; because of being a non-breeder a postmortem examination was not had, and on the other one we could get no history. So there are three out of the five that definitely were infected and reacted.

Cattle in the advanced stages of the disease showing emaciation, even though infected, will not react. Out of about thirty postmortem examinations that we have held on reacting cattle we have found evidence of the disease in all but one. In that one we did not. That animal was a marked reactor, showed a pronounced reaction, but we could not find any evidence of the disease in her. So much for the accuracy of the test.

Cattle that react once may not react again. We only have a few observations on that. The majority will. We have two animals, however, that were tested the second time that did not; they were, however, commencing to show clinical manifestations of the disease at the time of the second test. Will animals infected with avian tuberculosis react? We have five sheep that are infected with Johne's disease. They react consistently and markedly to Johnin; there isn't any question about it. Four of the five reacted to avian tuberculin. The reactions were not so pronounced, 105° F. being the highest; 104° being the average.

How fast does the disease spread in infected herds? It sometimes spreads more rapidly than others. There was a sale held in 1910 at Waterloo, Iowa, a Jersey sale. At that sale were sold some imported Jersey heifers. On two Wisconsin farms, to which animals were taken from this sale, Johne's disease was diagnosed. It was not diagnosed, however, for ten years, or about 1920. The first herd in question, the owner bought

in 1910. One of these imported heifers exhibited symptoms in 1912; in 1913 the second one did; in 1914 the third one died, but in 1913 one young cow of his own raising exhibited symptoms of the disease. This herd contained eighteen to twenty-five animals. Between 1912 and 1920 that man lost 12% yearly. That is a pretty heavy herd tax. The other herd consisted of about forty-five animals, with much the same history. The yearly loss was 8.5% between 1912 and 1920. Another herd consisting of about forty-five, between 1903 when he purchased an infected bull from another Wisconsin breeder and 1920 sustained a yearly loss of 4.7%.

Is the Johnin test effective in eradicating this disease from herds? Apparently it is. I say apparently because we are dealing with a disease of a peculiar nature, the progress of which is slow. We don't know just when in any given herd to say the disease does not exist. In this one herd that I spoke of, where the man introduced infection in 1903, we made a test in 1917 and the last in 1923. He has not had a clinical case since 1921; had one reactor in 1923, and the animal was promptly removed. The next year the herd was tested and no reactors were found. It has not been tested since, but no clinical cases have appeared. We have had similar results in other Wisconsin herds. To the best of our knowledge the test is reasonably accurate if properly applied. We do not maintain that we know as much about the disease or the test as we should know or as we hope to know.

The old time molasses, blackstrap or treacle possesses quantities of vitamin B. and is therefore a valuable supplemental feed.

Bovine coccidiosis was recently identified in a lot of steers on full feed in Northeast Kansas. This is a troublesome malady as treatment of affected animals has not been successful. The treatment recommended consists of sulphur 2 parts, ferrous sulphate 2 parts, and common salt 6 parts. Thoroughly mix and give in chopped feed.

DIFFICULT BREEDING IN HORSES

I am asking for advice, or suggestions, regarding a thoroughbred stallion, eight years old. Six mares were bred to this animal in 1927, no foals resulting. So far this year four mares have been bred to him, and each mare has returned for the third time. One of these mares foaled early in April, this year.

I have examined the semen, and have found abundant live action spermatozoa. This stallion has been raced but a very few times in the past two years. In fact, he raced only three times in 1927.—J. L. M., Cal.

Reply: From the history of your case and since you have found numerous active spermatozoa in semen from the stallion, it appears that you will have to look for the cause of the failure to breed in the mares, rather than in the stallion. Probably the trouble is due to infection, possibly uterine, but more likely vaginal.

From your inquiry, it is assumed that only one of the ten mares has foaled recently. Mares that are not foaling regularly are notoriously hard to breed. The mare that foaled in April might have become infected during her last pregnancy, and may require treatment now.

In contrast to the cow wherein genital infection ordinarily results in a shortened period of pregnancy, genital infection in the mare commonly results in the foal being carried over time. Even a few days over time is indicative of infection. This may give you an indication as to whether or not that particular mare is at fault.

It is suggested that you examine the mares carefully. See whether or not they are suffering with a cervicitis or possibly endo-metritis. Take vaginal cultures. Take uterine cultures by using a long glass speculum that you have sterilized. Set the speculum against the cervix and pass a platinum loop fastened to a glass rod or something else into the uterus and get some cultures from there. After you have examined the organs of the mares for healthfulness, both by manual examination of the ovaries and uterus and bacteriological examinations, let us know your findings, please.

Professional Intolerance*

By I. D. JACKSON, D. V. M., M. D., San Antonio, Tex.

THE kindest, biggest, hardest working people in the world are professional men and women. They have no schedule of hours; no time in the twenty-four that they are really off duty; always subject to calls, no matter how late the hour, how dark the night, or uncomfortable the surroundings. They all respond to calls of mercy, not just once a year. Every day and night in the year they go forth to relieve pain and suffering and administer to the more unfortunate men or animals. This constant battle to help the afflicted engenders mercy and kindness within their hearts, mellows and soothes the doctor to the kindliest gentleman in every community. There is no greater field in which to render service to humanity than is found in the Veterinary and the Medical professions.

Last year in San Antonio alone 313 babies less than a year old died from gastro-intestinal disorders. The veterinary profession here and throughout Texas knows that dirty, raw milk contributed largely to this mortality. The veterinarian is better prepared to help remedy this condition than the physician, for he better understands the hazard of the fly, its breeding places, and the dangers of garget in dairy cattle. He understands the contaminating surroundings of the average dairy barn. His influence with the dairy men is much greater than is that of the physician.

Rabies also took at least one life last year in this city and sent hundreds away from their businesses, cost thousands of dollars and caused untold anxiety for hundreds of mothers in this city. The veterinarian knows best how to control this disease, and he should take the initiative in eradicating it.

Tuberculosis, especially bone T. B. and other forms of surgical T. B., is the problem of the veterinarians, for we know that where bovine T. B. reigns, there are found crippled children. It was found that the milk of over eight hundred cattle ill with tuberculosis was supplying every day infected milk for the children of this city to consume. We should spend more money to eradicate tuberculosis among our dairy cattle and we would have to spend much less for hospitals and treat fewer crippled children.

The future health of every community rests in a great measure upon the shoulders of the veterinarian. It is your duty to fight, yes, lead the fight, for clean milk, rabies prevention and house fly destruction. You and you alone understand meat inspection and how to assure your city a wholesome meat supply.

So I point out these grave responsibilities that are on your shoulders; you are aware of their great significance.

When the Board of Health of this city worked for compulsory vaccination against smallpox, they found fighting them that little handful of weak minded, anemic brained fanatics that always rise up to prevent progress. In spite of their ignorance they are capable of much harm and we all need to be alive and on the job.

Don't say that you are too busy to fight to prevent disease. We gain our daily bread treating disease, but our members that give the greatest time to prevent disease are usually the men doing the greatest amount of work. Why? Because they are practically always greater men. They see the great necessity to prevent the ravages of disease. The strength, happiness and usefulness of a home, a business, a city or a nation exists in direct proportion to its health.

We lost only forty to fifty lives during the great flood here in 1919, yet we have spent over three million to prevent such a recurrence. We have spent $450,000 to

* Read at an Annual Meeting of The Texas Veterinary Medical Association, held in San Antonio, Tex.

prevent and fight fires. We spent $360,000 on our police department; we spent only $81,895 to prevent disease and maintain our health department, and yet we lost during 1926, 951 men, women and children from preventable disease. As mentioned before, 313 children under one year of age died from gastro-intestinal disturbances. The principal loss was during the hot months of June, July and August when our milk supply was at its worst. We lost 446 citizens from tuberculosis; from diphtheria 11, whooping cough 12, and leprosy 1; all of these diseases, and more, were preventable, a total of nearly 1000.

We have, we believe, the best mayor and city commissioners that this city has ever known. They are for public health and have given more freely to this cause than any of their predecessors, but it is appalling how cheaply we hold human life and how little public sentiment has been aroused to carry on this work.

If I may, let me insist that when you veterinarians return to your homes in this great empire of a state that you initiate a movement for cleaner milk; for rabies prevention; for inspected meat and take up the fight over the state for preventative medicine. Lead the fight against the house fly this early spring, and don't lead a fight among yourselves.

To do these things you must have a strong forceful honest state and national association. To do these things you will have to stand together and fight to improve your association. And here is where petty jealousy and professional intolerance must not enter. Don't fight the fellows in power, back them up.

Don't criticize unless you can offer a better policy and be able to carry it out. In your own home town don't knock the other veterinarians. If one is doing more practice than you are, don't try to destroy his prestige but fight to build him still greater and as you do this you yourself will become greater along with your competitor.

If Dr. Jones starts first to get a better milk ordinance, don't get luke warm and side in with the dairy men against him, but stand behind Dr. Jones and you will finish just as big a man as Jones.

Be big, make your competitor like you and be happy when he does a good deed. Encourage him, tell him you are with him, take part in all better health work, for you have talent and knowledge that the people need. Don't be stingy with it but spread sanitation in your town.

Difference of opinion between two doctors is a tragedy. It is lack of understanding that causes all ill feelings. When both parties thoroughly understand a situation there is no room for argument. It is ignorance that permits an argument or a misunderstanding.

If you feel your fellow practitioner has done you wrong, go to his office and lay the facts before him, give him your side, what you have heard that has hurt your feelings, and 99 times out of a hundred you will find that you were misinformed.

Patients and clients have a great way of misstating facts about one another. Don't believe what someone has told you that Jones has done to hurt your business. Be a man, go to Jones and tell him that Mr. Smith has said so and so, and that you want his side of the statement, then you will find out that Smith has misled you, and that Dr. Jones is a pretty decent fellow after all. You will go away a better friend to Dr. Jones than you were before.

You are just as great as I pictured you in the beginning of my remarks—wholesome, benevolent, kind and always ready to lend your skill and energy to suffering animals and prevent disease in man. But when it comes to your competitor there professional intolerance comes in. Stop, look and listen! Boost your competitors and that will boost yourself. Be a part of every laudable undertaking no matter if your keenest competitor is the first to start the work. Support him in it; go to his office and tell him you want a part in his work. Tell every one that he is right, that you endorse his unselfish work, and forget petty jealousy and the people in your town will call on you more often. You and your fellows will have more of this world's goods and your

city will have to spend less money for charitable hospitals, crippled children wards and your fellow citizens will live longer.

The members of the Texas State Veterinarian Medical Association assembled here today are in possession of the knowledge in preventative medicine, if applied to your respective towns and cities over the state that would save at least 10,000 lives in the next year. In health matters you are better educated and prepared to lead the fight than your professional colleague, the physician, when it comes to sanitary milk, sanitary meat, rabies and bovine tuberculosis. Our great loss in preventable disease is infant mortality, found greatest in June, July and August, when the milk supply is at its worst. What is true of San Antonio is true of your home town, and I am sure conditions are much worse in many localities than they are here.

Let plague break out on the shores of Mexico and kill a number of people, at once the whole nation is alarmed, but last year 1000 men, women and children died in this city alone from preventable disease and we got excited and spent $84 on disease prevention for each death. We had a few murders and spent $369,000 to prevent and punish crime. But is it not a crime to see 300 babies perish in one year? San Antonio should have a health budget of $250,000 a year. Your city should do likewise, and she will never do it unless you men stick together. Quit saying unprofessional things about each other and become big enough to join hands and let the world know that you veterinarians know how to reduce that mortality in your communities at least one-half.

The number of deaths in Illinois from diabetes increased from 315 in 1900 to 1,581 in 1926; an increase in the rate per 100,000 of more than 350 per cent. The state health department regards the substitution of electric motors for washboards and balloon tires for leather halfsoles, i.e, the results of prosperity, less work and more food, as being chiefly responsible for the increased prevalence of diabetes.

CASTOR BEANS POISONOUS

A correspondent writes as follows:

"Will you kindly inform me whether or not castor beans—the bean or growing plant —will eradicate moles? Some here declare they will. Let me hear, please.

"Another point is that it is claimed by persons here that care should be exercised because the bean is rank poison—a thing I can hardly credit as being true—how is this?

"I have always admired this plant castor bean and like to have them in the back of the lot—but if the bean is poisonous I will not like it so well. It is said that one can rid a place of moles by dropping the beans in the mole's runways. Is this authentic?

"As long as I have raised them I never supposed I was handling a poison vegetable growth. Set me right along this point and much oblige myself and neighbors."

The castor oil plant belongs to the spurge family, and many of the plants of this family are known to be toxic, some of these extremely toxic. Castor oil bean, by the way, has become widely naturalized in some sections of the country, particularly California. There can be no question of the toxic nature of the seeds. The seeds furnish the well known castor oil which is a mild and safe purgative. The pulp formed when the oil is removed is violently toxic. One of the toxins is an albuminous substance known as ricin. It is said that two or three seeds (beans) have caused death in man, and in recent years I have reported several cases of poisoning from using the seeds of this plant. Therefore, the waste products in the manufacture of castor oil is only used for fertilizer; it cannot be used as feed for stock.

The seeds often become rancid and the oil under such conditions is not usable. It also becomes acrid and irritating. The ricin, when given either hypodermically or by the mouth produces violent irritation of the gastro-intestinal tract, also of the bladder and kidneys. Occasional individuals are violently purged from handling the beans.

Ames, Iowa. L. H. Pammel.

HAY FEVER

This is the time of the year when many people complain of hay fever. We have recently made a study of the amount of ragweed in pastures in Iowa. Probably more than 50 per cent of the pastures of Iowa contain the small ragweed, *Ambrosia artemsiaefolia,* and a great deal of giant ragweed occurs along the roadsides. This probably is equally true of Nebraska, Missouri, Kansas, Illinois, Wisconsin and Minnesota.

One often hears it said that the goldenrod produces hay fever. It probably does if the plant comes in direct contact with the person, but otherwise hay fever occurs only from the pollen of plants that are pollinated by the wind (anemophilous). The plants with bright colored flowers (insect pollinated entomophilous) have heavy pollen that is not carried by the wind. Such plants are unimportant as causes of hay fever.

Dr. William Scheppergrell, who has been president of the American Hay Fever Association, and who lives in New Orleans, states that many diseases formerly classified as summer colds, rhinitis, and recurring catarrh are now generally recognized as hay fever. Asthma, long regarded as a nervous disease, is known to be due to the same causes that produce hay fever; certain forms of rheumatisms, colitis and migraine (sick headache) likewise belong to the allergic diseases, diseases due to protein poisoning, of which hay fever is the best known example and anaphylaxis was the first recognized. Urticaria (hives) is another disease belonging to the same group. It is estimated that 10 per cent of our population is susceptible to one or more of these diseases.

Hay fever is on the increase. This is due probably to the increasing facility of transportation, and to an increase in suburban settlement, and consequently more people come in contact with the various pollens that produce hay fever, and these include many tree pollens, and grass pollens, as well as the better known weed pollens. The following statement from Doctor Scheppergrell is of interest:

"During their attacks of hay fever patients should avoid localities infested with weeds generally, and especially with those weeds to the pollen of which they are sensitive.

"Electric fans should be avoided during the hay fever season, as the chilling of the surface of the skin tends to react on the mucous membrane of the nose, and in this way to increase the nasal irritation. In addition to this, the current of air from the fans disturb the dust, which contains its proportion of pollen during the hay fever season, the inhalation of which increases the discomfort of the patient."

The treatment for allergic disease consists in avoiding the proteins to which the victim is sensitive and where that is not practicable in desensitizing injections.

Of course, our readers are aware that horse hair and dandruff, bird feathers, the fur of many animals, turpentine, strawberries, raw oysters and many other sources of protein produce allergic poisoning (hay fever) in certain individuals.

Ames, Iowa. L. H. Pammel.

SUSPECTED SILAGE POISONING

Dr. W. P. Bossenberger, of Williams, Iowa, writes as follows:

"In the attached parcel I am sending you a sample of silage which the feeder thinks is causing red dysentery in his feeding cattle, but I am of the opinion that he has a case of hemorrhagic septicemia, as some of the calves which were not fed silage showed the bloody diarrhea long before the feeding cattle showed any symptoms of the infection. Please examine the specimens as soon as possible and let me know if it might be aggravating the condition or if you think the silage is the cause of the trouble."

The silage contains a number of molds, among these the common blue mold, *Penicillium glaucum.* It is not injurious. In my opinion, the silage is not the cause of the trouble referred to; nor does it aggravate the trouble.

Ames, Iowa. L. H. Pammel.

Bacteriology of the Udder*

By J. P. TORREY, East Lansing, Michigan, Bacteriologist, Michigan State College

ALONG with the increased supply and consumption of milk has come an increased demand for a better grade of milk by both the health authorities and the consuming public. Despite all of the improved methods of handling milk to prevent contamination from outside sources, the bacterial count may still run high. There is one source of contamination which is not easily controlled and that is the inside of the udder. It has been assumed that this type of organism is inoffensive, but dairy bacteriology has progressed to a point where it is now desirable to have our knowledge based on something more substantial than assumption.

It is difficult to overemphasize the importance of the part played by bacteria from the udder both to the producer and to the consumer. In early years of the science of bacteriology it was supposed that freshly drawn milk was sterile and would keep indefinitely if outside contamination could be prevented. In 1891 the presence of bacteria in freshly drawn milk was reported. It was stated, however, that the number decreased as the milking progressed. It has been definitely proven since that the normal udder may, and usually does, harbor bacteria throughout the whole extent of the lactiferous ducts, including the most minute ducts, where milk becomes contaminated as soon as secreted. This condition being true, it is necessary to discuss the flora of apparently normal udders. As normal udders I refer to those which have never shown any indication of mastitis and the milk from which looks normal.

There is some disagreement among authorities as to the classification of the organisms found in the normal udder due to the fact that there is no standard by which to classify these organisms. They do agree, however, on the general classification and the extent of these organisms in the udder. A study of 900 organisms from as many samples grouped them into twelve different species. More than 75% of them were micrococci. The remaining 25% were bacilli and unidentified forms. The udder flora is characterized by lack of motility, spore formation and gas formation. A large percentage are also gram-positive. In making a study of the flora of the udder, samples were drawn in sterile test tubes after the udder and flank were thoroughly disinfected. These samples were plated out in a short time and the individual colonies studied. The bacterial count of these samples ranged from apparently negative to 1,350,000 per cc. The bacteria were not evenly distributed among the quarters of the udder, there being about three times as many per cc. in the back as in the front quarters. The factors controlling this distribution have not been determined. Neither the age of the cow nor the period of lactation seems to have any appreciable effect upon the germ content of the normal udder. This is not true, however, in infected udders.

It has been thought for some time that the first few streams of milk contained practically all the organisms, the number gradually decreasing as milking was continued, but more recent work does not bear this out. It has been found that the first few streams contain a large number of organisms and the main bulk of the milk contains very few, while the count of the strippings or cream is greatly increased. The strippings, therefore, afford a representative sample of the flora of the udder. The persistence of a particular type of organism in the udder may be shown over a long period of time or the entire life of the animal. The number of organisms vary considerably at different times. This probably depends somewhat upon the physical condition of the animal.

We now come to the organisms which are of much more importance from the veteri-

* Presented at a meeting of the Southwestern Michigan Veterinary Medical Association, Kalamazoo, May 17, 1928, and included in Vol. 4, No. 6, *Michigan Veterinary News.*

narian's standpoint and these are the ones which produce visible changes in both the milk and the cow. Two organisms will include the majority of cases in this locality and these are streptococci and *B. abortus*. Streptococci infections can be found in practically every herd of any size. The owner usually does not recognize the fact unless a cow goes off feed or the milk is rendered unfit for use; then he becomes alarmed. It is very difficult in most cases to detect these infections except by a bacteriological examination. Some animals may carry the organisms for years and never show any apparent effects, while others develop a severe case of mastitis as soon as they become infected and lose the entire udder or quarter. This fact can only be explained by the variations in the resistance or immunity of the different animals.

Mastitis due to streptococci presents a varied picture. It may be either acute or chronic. One may develop into the other. It may be parenchymatous, catarrhal or interstitial. Not every case of infection, however, can be placed within one or the other of these divisions. Inflammation beginning in the parenchyma may extend downward to the milk canals, milk cistern or teat canal. Catarrhal mastitis may invade the parenchyma; and either of these forms may involve the interstitial connective tissue secondarily, while primary interstitial infection may break into the parenchyma. Nevertheless, a knowledge of the characteristics of each of the three types is essential in diagnosis, prognosis and treatment.

Equine fever or equine pernicious anemia is relatively widespread and although considerable research work has been done and some valuable information has been contained as to the artificial transmission of the disease, general symptoms and lesions; no effective method of control has been forthcoming. Carriers are apparently of common occurrence and cannot be detected except by inoculation experiments and this method does not always give conclusive results.

POSSIBLY COWBANE POISONING

Dr. E. W. Porter of Reynoldsburgh, Ohio, writes:

"Will you please identify the enclosed plant for me and advise as to its possible toxicity. This was taken from a pasture where several calves have died after showing symptoms such as weakness, staggering, blindness, followed by convulsions and death."

The plant is Horse nettle *Solanin carolliense*. The green parts of the plant probably contain one of the gluco-alkaloids which is injurious. Impaired vision and staggering may occur from eating it. Your mention of convulsions makes me believe that there may be cowbane in the pasture.

Ames, Iowa. L. H. Pammel.

CANNIBALISM IN YOUNG CHICKS

A client has asked me for the means of preventing toe pecking in a brood of baby chicks. They pick at one another's toes till they bleed and until the members are eaten off. In fact, they may be said to be eating themselves.—T. M.

Reply: Cannibalism among young chicks, is due to habit and also to deficient diet. The only way to correct this is to avoid conditions that are inducive to cannibalism, namely: overcrowding, bad feeding, etc.

Advise the owner to provide clean, roomy, well-ventilated quarters, and feed a ration that contains sufficient mineral matter, especially lime. It is very important that such chicks receive sufficient animal protein, but not too much. This element should be supplied in the form of meat scraps or other suitable animal food.

Buttermilk is excellent and can be fed in unlimited quantities. The meat scraps should be given in not too large quantities. Commercial mashes diluted to half strength by adding wheat bran in equal amounts is about the right proportion. The commercial mashes are as a rule too strong to use as directed unless diluted in above manner.

Animal protein is essential for growth, development, production, and prevention of

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the disease in question, but should be fed with caution or bad results will likely follow. It is also essential to feed abundantly fresh green food (sun grown), also grain in deep litter.

Chickens should never be allowed to become overcrowded, or bad results will often follow that cannot be corrected by medicine. I know of no specific drug or chemical that can be relied upon to correct cannibalism. The cause must be ascertained and removed. —F. D. Patterson, Jr.

PARTURIENT-PARESIS THREE MONTHS AFTER CALVING

I was called nine miles west of town to see a Jersey cow belonging to Ralph Elleman. I found the cow in a recumbent position, head around to side, nose reaching almost to udder, and she was moaning every breath. She had been down when found in the morning. I could place my fingers on the eye-ball without causing the eye to close, and could pull a hind leg straight back and it would remain in that position. I inquired how long it had been since the cow had calved and was told, it had been just three months. Thinking I misunderstood, I asked again and received the same reply. I said, "You will have to show me," and he did. The calf looked like it would weigh 250 lbs.

I asked the owner what he had been feeding this cow, and he said a little moldy corn, and good clover pasture, nothing more. I gave the usual treatment for parturient paresis, with 40 c.c. Pitman-Moore Hysolvets Compound, nothing more. Covered the cow with a heavy blanket and left. When I returned at 8:00 P. M., the same day, I found cow up and ruminating, and as normal as though nothing had been wrong.

What I want to know is, has any one had a like experience and was it parturient paresis occurring three months after parturition. If not why did it yield to this treatment?

Galveston, Ind. J. S. Leslie.

SARCOSPORIDIOSIS IN A MARE

The losses of livestock incident to parasitism are enormous. There are many different classes and groups of parasites and in the various veterinary journals and farm papers there have appeared numerous articles descriptive of parasitism; however, reports of sarcosporidiosis have been relatively rare and the following case report may be of interest.

A 12-year-old mare, in foal, evidenced some swelling in the parotid region, early in February, 1928. At this time there was drooling and inappetence. The swelling in the parotid region gradually subsided. About two weeks after the first observation the lips and tongue were extensively swollen. These swellings interfered with prehension and mastication but in the course of two or three weeks the swellings had subsided but the tongue and lips were apparently dense and hard.

This mare foaled May 1st, 1928, and because of the condition of the lips and tongue she was fed a liberal quantity of ground feed and had the best of care but she became so emaciated and weak that the colt was taken from her six weeks after foaling and fed on cow's milk. The mare finally went down and was unable to rise and was destroyed. A careful autopsy revealed numerous white and grayish white areas in the muscular tissue of the tongue, lips, and the skeletal muscles particularly, of the front legs and thorax. The involved muscles were dense and hard. On sectioning the white areas were found to involve the muscle fibres and were identified as sarcosporidia. The length of time that these parasites had been present and their source was not determined. Other conditions may have been factors in this case but the history symptoms and autopsy findings did not reveal any other pathological entity.

Should readers of VETERINARY MEDICINE have any comments on this case, particularly as to diagnosis, they will be published in a future issue.—A. T. K.

Cystotomy for Removal of a Vesical Calculus in a Bitch*

By W. M. MITCHELL, Edinburgh, Scotland

THE subject was a Pekinese bitch in which the presence of a calculus was discovered at parturition a few weeks before, the owner suspecting that there was still a puppy to be delivered.

Preparation of Instruments etc.—Instruments were all sterilised by boiling and then placed on a sterile Holland cloth covering an enamelled tray painted with pure carbolic acid. During the operation any instrument likely to be contaminated was discarded. Swabs of gauze were used throughout to mop bleeding surfaces, and these and all cloths and operating gowns had been previously sterilised and dried in a high pressure steam steriliser in Schimmelbusch drums. An assistant supplied swabs and cloths as required during the operation from these drums by means of special swab lifting forceps.

Preparation of Operator and Assistant. The hands of these were prepared as follows: (1) Washed for five minutes, at least, in running hot water, using 1% biniodid soap (P. D. and Co.); (2) Washed in hot water to which liq. cresol sap. had been added, using a sterile nail brush; (3) Rinsed in 1 in 5000 biniodid solution, which completed disinfection of the hands and got rid of the slipperiness of the soap. From time to time during the operation the hands were rinsed in such a basin of solution. After sterilisation of the hands a sterile gown was put on.

Preparation of the patient. For two or three days before operation the bitch received hexamin grs. 5 daily and the day before operation the ventral aspect of the abdomen was shaved. A hypodermic injection of morphin gr. ½ was given about two hours before operation, general anesthesia being maintained throughout the operation with C. E. mixture by means of a modified Junker's bottle. The bitch was stretched on her back and the abdomen painted with tincture of iodin.

Operation. Four small cloths were clipped to the skin of the abdomen by towel clips so as to leave a narrow quadrilateral area of skin exposed anterior to the pubes about three inches in length and one inch in breadth, one towel clip at each corner of the quadrilateral. The exposed skin was again painted with tincture of iodin. Two large Holland cloths were then placed so as to cover the whole dog except the head and also the table on each side of the dog to well beyond the edges. These two cloths were brought around the quadrilateral of exposed skin, the handles of the two towel clips on each side fixing the cloths and maintaining them in position. At each end of the quadrilateral the cloths were fixed by a single towel clip. The relaxed abdomen was now grasped through the cloths and the exact position of the bladder determined, as the calculus in it was about one inch in diameter.

An incision three inches in length was made in the middle line down to the external sheath of the rectus. At this stage a sterile cloth was clipped to each side of the wound by means of three pairs of Lane's tissue forceps, so placed that when the cloth was in position the forceps lay below it. The two cloths were clipped at each end of the incision by a pair of towel clips. In this way all risk of contamination of the peritoneal cavity from the skin of the animal was excluded during subsequent manipulations.

The abdominal cavity was now opened by incising through the rectus muscle a little towards one side of the middle line and the opening was enlarged sufficiently by

* Operation performed by W. M. Mitchell, M.C., B.Sc., M.R.C.V.S., Professor of Surgery, Royal (Dick) Veterinary College, Edinburgh, on the occasion of the Annual Meeting of the North of England Division at Newcastle-on-Tyne, 25th February, 1928. Published in *The Veterinary Record*, London, April 14, 1928.

means of blunt pointed scissors to allow the bladder to be brought outside. There was considerable distension of vessels in the wall of the bladder and as the dorsal surface appeared the least vascular it was determined to make the incision for removal of the stone through it. A folded pad, wrung out in hot normal saline solution was placed over the posterior part of the abdominal wound and the bladder turned backwards so that the dorsal surface could be operated upon; a similar pad was placed over the anterior part of the abdominal wound.

Just beyond the limits judged to be sufficient to make a large enough incision to permit of extraction of the stone, the bladder was grasped by two pairs of peritoneal tissue forceps, by means of which the assistant controlled the bladder incision throughout the subsequent steps. Around the bladder a number of gauze swabs were placed to catch any urine which might escape on opening it. A small opening was first made into the bladder and by means of a Record syringe the little urine which was present was drawn off. The incision was then enlarged sufficiently to remove the calculus without any tearing of the lips of the wound.

Closure of the Bladder. For this, Merson's curved eyeless needles armed with No. 00 sterilized catgut were used.

(1) A continuous suture was inserted, placed close up to the edge of the incision, passing from the serous surface down to the sub-mucous coat on one side, then in a reverse fashion on the other. The loops of the suture were placed close together so as to prevent leakage when the bladder should distend.

(2) A Lembert suture completely buried the first suture and was also continuous. The bladder was then returned to the abdominal cavity.

Closure of the Abdominal Wall. Buried sutures were of iodized catgut No. 1; skin sutures of silkworm gut.

(1) A continuous suture brought together all the structures from peritoneum to the external sheath of the rectus inclusive.

(2) A similar suture was placed in the subcutaneous fat.

(3) Interrupted sutures were used for the skin.

Protection of the Wound. The line of skin sutures was painted with tincture of iodin and two or three gauze swabs were placed over the wound, cotton and wool and a domette bandage around the abdomen.

OVARIOTOMY IN THE CAT

THREE cats, said to be about four to five months old, were provided for this operation, the same method of operating being adopted in each animal.

Operative Technic followed the lines as fully described in the operation of cystotomy on the preceding page, with the exception that cloths were not attached to the lips of the skin incision.

Preparation of the subject.—Food had been withheld for about 24 hours and both flanks shaved the day before. Prior to anesthetizing, atrophin sulphate, 1/200 gr., was given hypodermically to diminish salivation and the risk of heart failure. The anesthetic used was ether.

Position for operation.—The cat was laid on her side, an assistant grasping the two hind legs and extending them backwards and downwards with one hand, and with his other hand he gently grasped the thorax, thus maintaining the skin of the flank tense. A folded towel, about two inches thick, was placed below the lumbar region of the cat, so that the body was slightly flexed laterally.

Operation.—An oblique incision was made in the skin of the flank, nearer the last rib than the iliac crest, running downwards and backwards, *i.e.*, in the direction of the fibres of the ext. oblique muscle. Care was taken not to start too close to the lumbar mass of muscles by sinking a finger into the abdominal wall just below the mass before making the incision. After division of the subcutaneous fat the external oblique was in turn divided in the direction of its fibres. The edges of this muscle having been gently separated, the remaining tissues of the abdominal wall were punctured with the knife by a single stab. A blunt dissector, which

* Operation performed on the occasion of the Annual Meeting of the North of England Division at Newcastle-on-Tyne, 25th February, 1928. Published in *The Veterinary Record*, London, April 14, 1928.

had a straight spatula-shaped end at one extremity and a similar end only slightly curved so as to form a sort of hook at the other extremity, was used for the next step of the operation. Each end was about ¼ inch broad. The straight extremity was passed directly into the peritoneal cavity, thus slightly enlarging the stab puncture and at the same time proving the peritoneal cavity to be opened. The hooked extremity was then introduced and by means of it the extremity of the horn of the uterus lying in the sub-lumbar region was hooked laterally through the abdominal wall, followed by the ovary. Avoiding vessels, the end of a pair of Crile's artery forceps was passed through the broad ligament and two pieces of iodized catgut grasped and brought through the ligament. One ligature tied off the ovarian vessels and included the suspensory ligament of the ovary; the other, when tied, controlled hemorrhage from the end of the horn of the uterus. The ovary was removed by means of scissors. After the stump of the uterine horn was returned to the abdomen, a single catgut suture closed the small opening made by the stab puncture in the abdominal wall. If the cat should be fat, one or two sutures should be put in the external oblique muscle and subcutaneous fat, to obviate dead space.

The skin was sutured with interrupted silkworm gut sutures. The same procedure was repeated on the other side for the removal of the other ovary. A piece of sterile gauze over each wound was kept in place by a few turns of bandage round the abdomen, which gauze was to be removed the following day.

Edinburgh, Scotland. W. M. Mitchell.

Fowl typhoid is more or less prevalent in all sections of the country. Chickens are very susceptible to fowl typhoid. Turkeys, guinea fowl, pigeons, ducks, and geese are only slightly susceptible and man is immune. Sparrows and pigeons may carry infection from farm to farm. The disease can be controlled by proper sanitation and vaccination. —N. C. Tech. Bul. 27.

GAPES IN CHICKENS

Gapes is a parasitic disease caused by the *Syngamus trachealis*. It occurs most frequently in chicks two to eight weeks of age. The worms are reddish in color, 1/16 to ¾ inches in length and are attached to the tracheal wall of the host. It has a forked appearance, sort of a "y" shape, due to the attachment of the male to the anterior fourth of the female.

Turkeys are supposed to be carriers of this worm and cases are reported more frequently in chicks that are raised on ground inhabited by turkeys.

Symptoms.—Frequent gaping, sneezing and coughing with discharge of mucus are characteristic symptoms. Birds also become droopy and stand or sit with eyes closed and gasp at frequent intervals as if suffocating. By holding the head so as to stretch the neck, and having the light shine through the tissues of the throat the darkened outlines of the worms may be seen in the trachea.

Treatment.—When the disease is discovered the affected birds should be immediately isolated. The healthy birds should be removed to temporary quarters to watch for further development of new cases. If no new cases develop the healthy chicks should be moved to ground not previously occupied by poultry for several years. All worms and infected carcasses should be burned as eggs and embryos remain viable in the ground for long periods of time. Infested ground should be put under cultivation.

The treatment of individual birds by introducing the looped or knotted ends of two horse hairs into the trachea and dislodging the worms is usually a difficult one but may be accomplished with some practice.—Mo. State Poultry Experiment Station.

By a series of experiments Beach and Davis of California apparently demonstrated that chicks were afforded a degree of protection against coccidial infection by the use of two one-gram doses of lactose daily or by continuous feeding of a mash consisting of 20% lactose or 40% dry skim milk.—Hilgardia.

Cost of An Outbreak of Diphtheric Roup

By B. F. KAUPP, Raleigh, North Carolina
Avian Pathologist, North Carolina State College

THE commercial poultry year is November 1 to October 31 of the following calendar year. In the year 1925-'26 the experimental commercial laying flock of S. C. White Leghorns at the Mountain plant of the North Carolina State College of Agriculture and Engineering consisted of 750 birds valued at the beginning of the poultry year at $1,303.00. A detailed account of the year's operations showed the following costs per hen: Depreciation, $0.70; total feed, $2.047; grit, $0.13; litter, $0.012; labor, human, $0.23; truck, $0.014; buildings, $0.257; land, $0.010; water, $0.001; equipment, $0.025; interest on stock, $0.117; interest on feed and supplies, $0.026; miscellaneous, $0.086. Total per bird cost, $3.543. Returns per bird, $5.94, leaving a net profit per hen of $2.40. The total return for eggs from the flock at market price was $3,960.48, and from manure $107.70. A total net profit of $1,980.73.

In the second year of experimental production studies a test was run, as before, from November 1 to October 31.

There was a total of 1,000 birds in this test all S. C. White Leghorns.

The value of the birds at the start was $1,845.00.

Roup attacked this flock during the latter part of December and was not eradicated until about the first of March.

When roup appeared in the flock the birds were removed from the flock as fast as traces of the disease appeared. These birds were placed in a brooder house which was not in use at that time. Later this house was thoroughly cleaned and sprayed with a four per cent solution of a coal tar dip.

The sick birds were treated with a mixture of menthol, 10 grains; oil of thyme, 30 drops; oil of eucalyptus, 30 drops; and a light mineral oil, 2 ounces. In case of sore eyes, the lids were pressed open and the cheesy pus removed. A drop or two of this medicine was placed in the conjunctival sac. This was repeated once a day. In case of sores on the head, this mixture was rubbed on the sores once a week. In case of discharge from the nose the mucus was pressed out and by aid of a syringe the medicine was injected through the nostril, first pressing out all catarrhal products possible or syringing out with a one per cent solution of sodium hydroxid. The end of the syringe was inserted in the posterior nares in the roof of the mouth, forcing the medicine forward. In case of canker of the mouth, the cheesy pus which accumulates on the surface of the ulcer was scraped off and the ulcer swabbed with tincture of iodin.

None of the birds were returned to the laying house, but when well were sold on the market for slaughter. The danger from chronic carriers caused this action to be taken.

The house was cleaned frequently and disinfected. The ventilation was arranged so as to have ample pure air but no drafts on the perch poles, and the floor litter and floor was kept dry. There has been no recurrence of the trouble this year.

Success in the eradication of an outbreak of roup depends upon prompt action in removing the infected birds, maintaining the right hygienic and sanitary condition of the house, and not returning to the flock a bird that might become a chronic carrier. If a chronic carrier is present in the flock there will be an occasional bird come down through-

out the year; and when the pullets are placed with the flock in the fall, just as soon as the weather conditions are favorable to the disease, the susceptible pullets will come down with the disease.

An antiseptic should be used in the drinking water. Permanganate of potash is universally used for this. One-third teaspoonful of the crystals to the gallon drinking water is the right amount, contrary to what some have supposed, the antiseptic is not used in the water to cure roup but as an antiseptic to aid in destroying the germs of the disease that may be deposited in the water and by affected birds drinking from the container, and for its astringent effect on the cankerous patches of the mouth and esophagus and intestinal tract. We, of late, have been using another antiseptic which we believe is better and upon which organic matter has no effect, as it has with permanganate of potash. This is the four sulphophenols with sufficient bichlorid of mercury to make a solution of the latter of 1 to 20,000.

Effect of Roup on Cash Returns

The summary sheet shows the flock depreciation per bird of $1.47 as a result of the attack of roup against a charge of $0.70 in the flock running a normal course the previous year. The feed cost per bird was $1.91 against $2.04 for the previous year. The labor per hen was 23.6 cents; truck hours cost 14.3 cents; building 53.1 cents; interest on investment 16.1 cents per bird; and miscellaneous 10.8 cents per bird. The total cost per bird was $4.645.

The total cost of operating the plant was $3,113.15 which, subtracted from the gross returns of $3,338.42 leaves a net profit of $225.27 as against a net profit of $1,980.73 for the preceding year. This comparison makes the cash cost of the attack of roup in this flock $2,425.58 (allowing for the 250 additional birds the second year). It was responsible for the loss of more than 90 per cent of the profit that was to have been expected. The heavy loss was in dead birds and in egg production.

This means a total return per bird of $5.04 against a cost of $4.70, leaving a net profit per bird of 34 cents. There was an average of 662 hens for the year, figured on a hen day basis, which produced 95,370 eggs or 144 eggs per hen for the year. This is an average production of 39 per cent. It required 6 pounds of feed to produce a dozen eggs. The feed cost per dozen eggs was 16 cents, making a total cost per dozen 26 cents. The average monthly price was 40 cents a dozen. The eggs were sold at Asheville and all feed was purchased locally.

Summary of the Experiment

In a study of the results of the second year in egg production when a virulent outbreak of roup attacked the flock there are two outstanding points to observe:

First, if quick and proper steps be taken, roup can be eradicated from the flock.

Second, during the two or three months that the attack of roup may last there will be considerable slump in production. This slump will not be made up later in the year but is a permanent loss.

It is believed that had this flock not had much better than average care during the attack of roup that instead of showing a net profit of 34 cents per bird for the year it would have shown a heavy net loss making the cash cost of the attack of roup proportionately larger.

It is also noticed from the tabulation that the consumption of mash fell perceptibly during the months of January and February or during the attack of roup. The total average consumption of feed per hen per day for the year was 3.6 ounces during the normal year and 3.04 ounces during the year of attack by roup. The annual production was 47.7 per cent during the normal year and 39.4 per cent during the year of attack by roup.

In the matter of production there is noted a reduction in the second year in December, January and February. This is due to the disease attacking the flock during the latter part of December.

YOUR DOG AND MINE*

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Symptoms of Rabies—II

Like many other diseases, and particularly like other diseases of the nervous system, the symptoms of rabies are varied. Yet on the whole, it is a disease that presents certain definite symptoms with great regularity. One who has seen any considerable number of cases of rabies will ordinarily recognize it with ease and certainty. There is an anxious expression to the countenance that is very characteristic, and a peculiar hoarseness in the bark by which experienced veterinarians often recognize as rabies, even without seeing the animal.

Notwithstanding these and many other diagnostic symptoms, mistakes in the diagnosis of this disease are frequently made. Perhaps because of the common name of "mad dog" for this disease, persons on the street are inclined to diagnose as rabid any dog that acts wildly, whether the wildness be due to convulsions from fright, teasing, indigestion, distemper or other causes. A harmless dog that has been tincanned or turpentined by mischievous boys or degenerate adults, because of its manifest terror is apt to be set upon with the cry of "mad dog." Such a dog is mad without doubt, but it has not rabies.

In a typical case of rabies, there is nervousness, shyness, excitement, frenzy, delirium, stupor, paralysis and death. Two general types are recognized, one where the excitement and frenzy are the prominent symptoms and the other where these symptoms may be all but absent and the stupor and paralytic stage predominate. The former is called furious rabies, and the latter, dumb rabies.

The following may be given as the more common signs of furious rabies. A change in behavior, the friendly dog becoming shy and melancholy and the shy or morose dog exceedingly friendly, next they are restless and obey their masters unwillingly, become irritable and prone to attack strangers, and their owners, too, if teased. As the disease progresses, they bark without cause, and bite at the air as if catching flies. They are easily startled and extremely nervous. In the course of a day or two, the nervousness becomes more marked and they are apt to eat foreign objects, tear up cushions, and if confined scratch at doors or chew their leashes.

If they are approached by strangers or strange dogs, they may fly into a rage and attack them. They refuse normal food and eat refuse, sticks and stones. They lose condition rapidly. If allowed liberty, they leave home and wander aimlessly long distances. At about this time, the paralysis becomes plainly noticeable, the lower jaw drops and the mouth hangs somewhat open allowing saliva to drool from the lips and the gait begins to be unsteady, particularly in the hind legs. They attack furiously any and all animals that they come across. Strangers are often bitten, when the animals are in this stage. Normal dogs try to avoid them and may not fight back even when attacked; the voice is markedly changed and the animal barks or howls a great deal, particularly if confined. In another day the sight is impaired and the animal runs into all manner of objects, the gait becomes more uncertain and it reels and staggers as it walks. There is little tendency to fight but it snaps at objects, animals and persons indiscriminately that come in contact with it. Complete paralysis and death follows in a few hours,

* The articles under this head are part of a series of fifty-two discussions written by the editor of VETERINARY MEDICINE and distributed by a newspaper syndicate organization to various daily newspapers for use in their Saturday editions each week. Although written exclusively for lay readers they are offered here, with permission of the syndicate, for such suggestions as they may contain, for the veterinarian who desires to instruct his clients in the care of their dogs, with a view to increasing the popularity of this animal among those whom he serves. Where some repetition is noted, it should be remembered that the articles were published separately at weekly intervals and it was necessary that each be in a measure complete.

the whole attack usually lasting four to six days.

In dumb rabies, the stages of excitement are absent or unimportant. At first there is shyness, then pronounced melancholy quickly followed by delirium or semi-consciousness and in another day death. Paralysis is more marked and begins earlier than in the furious type. An attack of dumb rabies ordinarily lasts from two to four days.

In every case of suspected rabies, in fact in every case where a person is bitten by a dog, it is very important that an accurate diagnosis be made. Therefore, do not kill the dog if it is at all possible to catch and confine him for observation. If he remains alive and well for a week, he has not rabies; if he acts peculiar, take him to a veterinarian for observation.

If a dog that has bitten a person, or a dog that is suspected of having rabies is killed before a definite diagnosis of his ailment is made, take or send his head to a pathology laboratory for a microscopic examination of the brain, and such diagnosis, as can be made by that means.

Control of Rabies—Muzzling

Rabies was probably one of the first diseases of animals recognized by man. It was well understood by the ancient Greeks at the time of Xenophon, 2300 years ago. In India it was known much earlier than that. The first English writer to describe a disease of animals, Friar Glanville, understood fully how rabies is spread, for in his description of the disease, written about the middle of the 13th century, he said:

"The biting of the wood hound [rabid dog] is deadly and venomous, and such venom is perilous, for it is long hidden and unknown, and increaseth and multiplyeth itself, and is sometimes unknown to the year end, and then at the same day and hour it cometh to the head and breedeth frenzy. Against the biting of a wood hound, wise men and ready used to make the wounds bleed with fire or with iron, that the venom may come out with the blood that floweth out of the wound."

Although rabies is one of the oldest known diseases of animals and the most fatal, it is the only disease for which no cure or treatment is known. Our whole effort in the matter of this disease must be directed at preventing it. Fortunately it is not only preventable, but of the important disease of animals, it is the easiest to completely eradicate.

Rabies has been eradicated from England, Scotland, Wales, Denmark, Norway, Sweden, large portions of Germany and from Canada several times. It is spread from dog to dog and to other animals almost exclusively by the bite of the dog. Prevent this one means of spread, stop dogs from biting one another and from biting other animals for a period of a year or say for a period of two years, for additional safety, and rabies will cease to exist.

A single reservation to this statement possibly should be made. It is not known how important the dog's near relative, the wolf may be in the spread of this disease. Rabies exists among the coyotes and wolves of some of the western states.

Rabies was eradicated from the countries mentioned by muzzling regulations. Muzzling dogs is often opposed on the grounds of cruelty. To charge that compelling a dog to wear a proper muzzle, whenever he is unconfined, is cruel, is somewhat overstating the case. Wearing a muzzle is uncomfortable for a dog; so is wearing glasses uncomfortable for a man; but often the advantages of wearing them outweigh the discomfort.

It should be remembered that rabies is a disease that causes extreme suffering. One can scarcely imagine a more agonizing death than that resulting from an attack of rabies. Thousands of animals die yearly in this country from rabies. Their suffering inconceivably exceeds any that would be occasioned by muzzling all dogs in America for the next 100 years. So the real cruelty to dogs lies in permitting the disease to continue killing them by the thousands annually.

Control of Rabies and Muzzling Regulations

Control measures for the prevention of Rabies antedate recorded history. Two thousand years ago these measures consisted in quarantining, restraining and muzzling the dog. And today in all civilized countries the sanitary laws provide these same restrictions on dogs whenever the disease becomes prevalent in a locality.

In an earlier discussion, in this column, it was told that Great Britain and some continental European countries have eradicated rabies by muzzling regulations for dogs. Those countries have maintained freedom from this disease by a six months' quarantine on dogs on importation.

Although rabies affects all domestic animals and many wild animals it is essentially a disease of dogs and is spread primarily by the bite of affected dogs. It therefore appears that muzzling, quarantining and restraining dogs when enforced should eradicate the disease and such has been the experience of the countries mentioned and of Canada where the disease has been repeatedly eradicated only to be reintroduced by infected dogs from the United States crossing the imperfectly patrolled border.

In the United States public opinion has never supported dog muzzling regulations except in the presence of outbreaks of rabies and then only in the communities affected and areas immediately surrounding such communities. This measure has in all instances been sufficient to check the disease after a longer or shorter period but of course, is ineffective as a measure of eradication which requires that all dogs in the whole country be effectually muzzled all the time whenever unconfined until the disease is completely eradicated.

In spite of these piece-meal methods for the control of rabies which have admittedly accomplished much, the disease has increased in prevalence considerably over the whole country during the past twenty years and cannot be considered less than a menace at the present time. No complete statistics on the prevalence of rabies are available. Georgia alone in 1924 reported 509 cases in animals and 2,569 persons applying for anti-rabic treatment; Florida in the same year reported 171 cases in animals, New Jersey 243 cases and Massachusetts 274. The great prevalence of this disease in Iowa in 1925 was mentioned in an earlier discission in this column.

After several years of freedom from the disease, rabies was again introduced in Canada in 1926 by means of hunting dogs taken into the Dominion from the States. The disease first appeared in the low country of Quebec where it had been unknown before and was not recognized for sometime. It spread rapidly and before it was brought under control by rigid muzzling regulations, had spread to half a dozen counties. It required three months of energetic work on the part of the Veterinary branch of the Department of Agriculture to bring the disease under control and eradicate it. Dogs, cattle and sheep were affected. A number of persons were bitten, but all took the Pasteur treatment and escaped the disease.

Unfortunately, the old measures of control of rabies, quarantine, restraint and muzzling have but partially controlled and entirely failed to eliminate the disease in this country. This is due to the public as a whole not being in sympathy with these measures, and for that reason the enforcement is not carried out effectively. Owners of dogs are prone to adopt for their pets, muzzles that interfere the least with their comfort, or to disregard muzzling regulations altogether. Thus very few dogs are effectively muzzled. And there is always the stray animal, the worst spreader of the disease, that nobody muzzles at all.

About five years ago a vaccine was developed that gives promise of being a feasible means of eradicating rabies from this country. It will be discussed in this column at a later date.

Reviews and Abstracts

Choke in Swine

Sabarros[1] states that although reports are frequent enough of foreign bodies obstructing the esophagus of horses, cattle and dogs, this accident is fairly rare in the hog. In the literature one will find but one mention of it, a small treatise published some twenty years ago by Fontan. Moussu, in his treatise on "Diseases of Swine" does not even mention the subject; nor does Kinsley in "Swine Practice." One is led to believe therefore that these obstructions occur but rarely. The author, however, has observed choke in hogs in 60% of all cases of esophageal obstruction that have come to his attention over a period of seven years.

Etiology. Among predisposing factors the author mentions feeding of bulky kitchen refuse, uncut or undivided fruits, entire vegetables, above all fried or baked or spoiled potatoes. Still hogs on pasture suffer from obstructions. The construction of the esophagus is such that at its point of entrance into the thorax, it is, with other structures, closely crowded in between the first pair of ribs which not only hinder its expansion but which as well stop the passage of too voluminous objects. This is the reason why in the majority of cases the obstructions are in the cervical part of the organ. Another factor is the greedy and ravenous appetite of hogs which manifests itself especially when several animals are fed together.

Symptoms. Symptoms are functional and local as well. The functional symptoms are in most instances very clear. The animal swallows violently, then tries to vomit. These symptoms pass over quickly but upon again eating, additional food is thrown up. Saliva will flow out of the mouth, at intervals of about 15 to 20 minutes, in large quantities. Sometimes a slight dyspnea is noted. Only bimanual palpation will in lean subjects reveal the obstruction. The duration of choke in the hog is varying in length and if not relieved by treatment the termination is always fatal.

Diagnosis. The diagnosis is easily made if one watches the animal drink and if one observes the return flow of liquids.

Prognosis. The prognosis should always be guarded and serious, since perforation of the esophagus easily happens.

Treatment. Treatment is only indicated if the animal is not fat or being fattened, or if one is dealing with a valuable breeding specimen. Should this not be the case, butchering ought to be advised.

Mechanical measures such as is used in the ruminants are not successful in swine. Attempts of owners to push back the obstacle or massage from the exterior with the view of moving it either way are generally unsuccessful, often ending in a ruptured esophagus.

Therapeutic measures such as subcutaneous injections of pilocarpin and eserin might be tried (care has to be taken or else abortion might be caused in sows). Mucilaginous drinks might be given to facilitate the progress of the obstacle as per Fontan.

Surgical measures. Esophagotomy, the last resort in other animals, has to be considered a primary desideratum in the hog. The instruments needed are: a convex bistoury, curved scissors, hemostats, long-shanked forceps, rattooth thumb forceps, a spreader, a specially constructed S-shaped esophageal support, curved needles, suture material, etc.

The operation should be performed from the left side. The head of the animal should be bent backward forcibly so that the muscles of the inferior cervical region are tensed. The operator then incises the skin in the jugular furrow for a distance of three to five inches. Two fingers are inserted into the space between the sterno-hyoideus and the sterno-cephalic muscles below the inferior edge of parotid. After

[1] Esophageal Obstruction in Hogs by Foreign Bodies, by J. L. Sabarros, V. M. D., Cabanac High Pyrenees, Revue Veterinaire et Journal de Medecine Veterinarie, December 1927. Abstracted by H. J. Magens, Kerrville, Texas.

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tearing lipoid tissues the esophagus will be found close to the trachea. The point of obstruction is always easily located.

The esophagus is to be dissected out from adjacent organs and tissues. Pass two fingers below the obstruction and the enlargement caused therefrom, placing the S-shaped support, working it to and fro, thus completely isolating the esophagus from its supports and appendages.

Then apply long shanked forceps over entire esophagus anterior to the obstruction in order not to be bothered by a flow of saliva after the incision has been made. To prevent the soiling of the operative field from contact with the debris, etc., coming forth with the foreign article when being extracted, one may place several layers of gauze under it or the esophagus section proper to be incised. The incision into the esophagus is to be made longitudinally.

After cleaning the field well, mucosa and muscles are sutured using catgut. The external suture should be of silk.

The diet should be liquid and feeding should be small in amount and given at short intervals. Keep the animal from eating bedding.

The author reports five successful operations of this kind.

Rabies Prophylaxis

Rabies appears to have been rare prior to 1924 in the district served by the Federal Bureau of Animal Industry Laboratory at Denver, according to Stiles.[3] In the six-year period prior to 1924, only 94 heads of dogs were sent to this laboratory for rabies diagnosis and of this number none were found infected prior to November 1924. Rabies would appear to be still comparatively unknown in that section since only 20 cases have been diagnosed in the 54 heads examined since 1924.

Dr. Stiles states that rabies is increasing in all sections of the United States, and believes the cause to lie chiefly in the transportation of dogs by automobile tourists. He states that rabies is known in every country in the world. This is contrary to the belief of most authorities that large areas are free from rabies. For example, that the disease has not existed in Ireland for twenty years, nor in the Scandinavian countries for twice this period; that it has never occurred in Australia and in great sections of Africa and South America.

Deaths in man from rabies has been reported from only about one-half of the states. In the states reporting, 252 deaths occurred during the three-year period ending with 1927.

The author gives the period of incubation as varying between 14 days and 285 days or longer, with an average of three weeks to three months. In 1927, 60,000 persons in the United States were given the Pasteur treatment. He gives the failure of the Pasteur treatment to prevent rabies as varying between 0.1% and 0.7%; the cause of failures being due to alcoholism, syphilis, neurotic disorders, fatigue, massive doses of virus, facial wounds and other predisposing causes.

Since the introduction of the single injection prophylaxis for dogs by Umeno and Doi in 1921, 500,000 dogs have been vaccinated in Japan and more than 2,000,000 in the United States.

The incidence of rabies in unvaccinated dogs was 14 times as high as in the vaccinated dogs in Detroit. Elsewhere the Japanese method of preventing rabies in dogs has made even a better showing. All extensive users of the vaccine, however, agree that there are occasional failures. This, of course, is expected of any product.

In showing the possibilities of spread of the disease an instance is cited of a rabid dog that is known to have traveled a distance of 147 miles and to have bitten at least 93 dogs. Two cases have been reported of rabid dogs biting 10 persons each and one biting 13 persons. To say nothing of the mental anguish and loss of time in these instances the expense of 33 Pasteur treatments might have been saved by vaccinating three dogs.

[3] Rabies Prophylaxis, by Geo. W. Stiles, B.S., M.D., Ph.D.; Colorado Medicine, May 1928.

Control of Stomach Worms in Sheep

Bell and Warwick in a recent article[3] give a very lucid account of successful methods for handling sheep so as to avoid losses from stomach worms.

One of the problems of farm sheep raising is the prevention of injury and loss by stomach worms. Few farm flocks have not suffered from infestation. The losses have been such that stomach worms are frequently considered the greatest hindrance to successful and profitable sheep production in the farm states.

Sheep of any age are liable to infestation with stomach worms, but the heaviest infestations are usually among lambs. Infestation may occur at any season of the year. The trouble is usually first noticed in young lambs about the middle of the summer, though it may become evident much earlier, depending upon the temperature and moisture conditions that have prevailed. Often the first notice that infestation is present is the death of one or more sheep or lambs. However, if the flock is closely attended the symptoms of stomach worms are usually noticed before death claims its victim.

The symptoms of stomach worm disease in sheep can often be recognized by the languid, lazy walk; drooping ears; hanging head; emaciated body; and shaggy wool coat. The picture in general is that of dullness, listlessness, and lack of thrift. Diarrhea is often present.

Close examination of an infested sheep reveals the skin pale and papery in appearance. The mucous membrane of the eyes and mouth is pale. The wool is dry and harsh, lacks luster, and is usually tangled and shaggy. As the disease progresses respiration is increased and a painless, watery swelling sometimes appears under the jaw. The disease may run a rapid course or the infested animal may linger for weeks or even months before death. The duration of the disease usually depends upon the age of the individual and the severity of the infestation.

[3] Control of Stomach Worms in Sheep, by D. S. Bell and B. L. Warwick; Bimonthly Bulletin, Ohio Agricultural Experiment Station, Vol. 13, No. 3, June 1928.

If worms are present, they will be seen either adhering to the wall or folds of the stomach or swimming in the liquid contents.

Adult stomach worms vary in length from ½ to 1¼ inches and are about as thick as an ordinary pin. The female is larger than the male and is spirally striped red and white. This spiral striping of the female is a means of readily identifying the worm.

The modes and sources of infestation are many. When sufficient moisture is present and the rays of the sun are indirect and the temperature is above 40° F., the mature larvae migrate upward on blades of grass and are taken in by the sheep while grazing. The larvae are also capable of living in water and may be swallowed by sheep when drinking from small ponds or pools in contaminated premises. Sheep may pick up a few larvae from contaminated bedding, and nursing lambs may get some few larvae from the udder or wool locks of their dam.

Sheep or lambs that are free from stomach worms are almost sure to become infested when grazing with infested sheep, or when grazing upon land recently pastured by infested animals. It has been carefully estimated that one heavily infested sheep may pass as many as three million stomach worm eggs every twenty-four hours. Thus restricted pasture areas, such as small barn lots, lanes, or old permanent pastures, are likely to be polluted with infestive larvae.

The ewe flock is the source from which the worms are spread, and control measures should be directed toward all the sheep and lambs in the flock.

The methods of prevention that are effective are based upon the life history of the parasite. Uninfested sheep should not be allowed to graze along with those that are infested; nor on pasture that has recently carried infested animals.

Good feed allowed in liberal amounts aids the lambs to withstand stomach worms. A recent test at the Ohio station showed that a high plane of nutrition, affected by allowing the lambs all the mixed grain they would eat, aided them to withstand infestation and

to put on gain at a rapid rate. However, two lambs out of the 15 in this group became quite heavily infested with stomach worms.

Lambs which were treated at regular monthly intervals with copper-sulphate solution and allowed all the grain they would eat harbored only 6.8% as many worms as similar lambs not fed grain and not treated with medicine. The regular monthly treatment alone, as indicated by still another group of lambs, was only 3.2% less effective against the worms than the combination of feed and treatment.

The feeding of tobacco, either in the feed or mixed with the salt, has proved effective against stomach worms at this and other stations.

Treatment with copper-sulphate solution has been found highly effective against stomach worms. The Ohio Experiment Station has used and found effective a solution prepared by dissolving two ounces of uniformly blue crystals of copper-sulphate in one gallon of rain or distilled water.

This solution is administered according to the following dosage table:

For lambs 3 months old.....20 cc.
For lambs 6 months old.....40 cc.
For yearling sheep.....60 cc.
For aged sheep.....90 cc.

In preparing the solution a glass, wooden, or earthenware vessel should be used, but never a metallic container. Care should be taken that the solution is kept thoroughly mixed and that the dose is measured accurately.

It is usually considered best to withhold feed and water from the sheep for 12 hours before and six hours after treatment. Sheep should be kept in a standing position and handled so as to prevent struggling while being drenched. A satisfactory way to control a sheep is to back it into a corner, straddle its neck, and hold its head so that the nose is not higher than level with the eyes.

The medicine may be administered by means of a dosing syringe; a graduated drenching bottle; a measuring glass, hose with a metal mouthpiece, and a funnel; or a graduated siphon arrangement as devised by the Federal Bureau of Animal Industry.

Regardless of the equipment used, the dose should be accurately measured and should not be administered faster than it can be readily swallowed by the sheep. If the solution is administered too hastily a part of it may go to the lungs and produce mechanical pneumonia, but with careful dosing these cases are very rare.

It is safer to avoid dosing ewes during the last month of pregnancy. While no ill effects are likely to follow from the actual dosing, yet crowding or handling incident to the treatment may be injurious.

The Federal Bureau of Animal Industry has demonstrated that the treating of the entire flock with copper sulphate solution at four-week intervals is an effective means of preventing loss from stomach worms.

In severe infestation where it is imperative that the flock be rid of the stomach worms at the earliest possible date, the sheep should be given a second treatment 10 days after the first treatment was administered. This is often practiced in the case of feeder lambs. Sometimes three or even four treatments are called for. It has been noted that occasionally a very few individual sheep or lambs in a flock do not show improvement after the administration of a vermifuge. In studying the course followed by liquid drenches when given to lambs it was found that in a few instances the liquid all went into the paunch. It seems possible that the liquid drenches that go directly into the paunch become too dilute before reaching the fourth stomach to be of vermicidal value against the stomach worms present. In such instances where individual sheep have not responded to treatment they should be removed from the flock and re-dosed.

Vaccination for the Prevention of Infectious Abortion

In an address before the Indiana Veterinary Medical Association, Cahill,[4] a leading exponent of the use of *B. abortus* vaccine (living organisms) for the control and prevention of infectious abortion of cattle, stressed the advantages of this method of handling the disease and the impracticability of the "Pennsylvania plan."

According to the speaker, abortion disease causes a greater economic loss in this country than any other disease of cattle.

There is less agreement among veterinarians as to the method of controlling this disease than there is regarding any other phase of the subject, a thing that is most unfortunate for the cattle industry.

Some believe that the proper way to control abortion disease is by serological testing, isolation and sanitation. Others believe the disease can be effectually controlled by vaccination. In the opinion of the author it cannot be controlled solely by either plan.

The extent of the infection is an important factor. A large percentage of all the cattle in dairy sections are affected. Doctor Bux has shown that serological testing, isolation and sanitation will control the disease in Arkansas where there is little infection; but such a plan is entirely impractical in a dairy section where from 60 to 90% of the herds are infected and where accessions to the herds must be made continuously to keep up a large milk supply, which is the desideratum of the dairyman.

It is recognized that the Bang organism is not always responsible for abortion. Streptococci, *B. pyocyaneus, Vibrio fetus,* colon bacilli and perhaps other organisms are responsible for abortion that cannot be differentiated clinically from the disease caused by the Bang bacillus.

In the large commercial dairies where abortion has existed for a long time and the percentage of infection is high, it is idle to talk of isolation and sanitation as a practical plan for control. Such a dairyman must maintain a large milk supply. To sell off 60 to 90% of his animals without replacing them would mean to go out of business, and where would he go for replacements not only to take the place of the first loss from isolation, but for replacements the second month, the third month, and every month thereafter? The live stock industry looks to us for results in the control of disease and the practicing veterinarian cannot afford to recommend idealistic but impractical plans to his clients.

The "Pennsylvania plan" is essentially the Bang system for the control of tuberculosis applied to abortion disease. It has never proved practical in the United States, and has not reduced tuberculosis among cattle in Denmark where it has been employed for a quarter of a century. For the states to attempt to carry out such a plan is to undertake another paternalistic method of control, and state veterinary medicine in this country has gone far enough. The practicing veterinarian has at his command in vaccination, the means for obtaining for his client a calf crop that will be entirely satisfactory at comparatively small expense to the owner. This being true, there is no justification for state intervention or for impractical control plans which eliminate the practitioner who is so essential to the future of the live stock industry.

The control of abortion by sanitation and isolation is beset by so many pitfalls as to make it an impractical recommendation except as a last resort. The plan is impractical on account of the large percentage of mistakes that will occur. The dissatisfaction which would follow reinfections and failures to clean up the disease would be exceedingly injurious to the profession.

That some sanitary officials doubt the practicability of controlling abortion by sanitation and isolation is indicated by the statement of Dr. Mohler, who in 1926 said: "The difficulties connected with the isolation and sanitation plan make it highly important that some better means of control be dis-

[4] Infectious Abortion, by E. A. Cahill; Year Book, 1928, Indiana Veterinary Medical Association.

covered." In 1927, Dr. Mohler said: "That some tests in handling infectious abortion by keeping the reacting and non-reacting in separate herds on the same farm, failed to demonstrate the practicability of this measure."

Doctor Cahill stated that he is not an opponent of the sanitation and isolation plan, but insists that its value lies in herds where but a very small percentage of animals are infected and where regular replacements are not necessary. The plan is entirely impracticable under ordinary circumstances.

In many communities, the practitioners are obtaining results that satisfy their clients by vaccination when vaccination is indicated. In such cases a normal calf crop is obtained, clients are satisfied and there is no demand for intervention by state authorities or county agents. It is in the communities where the practitioners take no interest in this matter or where they are attempting to apply impractical methods that there is developing unmistakable demand for control by others than the practitioner. The conclusion is obvious. If the practitioner wants to retain control of this disease, he must utilize the methods that are available for maintaining a normal calf crop and well at the top of this must be placed the use of living organism vaccine in infected herds.

Theobold Smith, than whom no better authority exists, has shown that by proper vaccination he obtained 100% of calves from vaccinated animals, not only for one but for two consecutive pregnancies, whereas his control and unvaccinated animals receiving the same dose of antigen aborted in considerable numbers. Theobold Smith's results are corroborated by many other outstanding research workers.

The Imperial Board of Health of Berlin have shown that the results which they obtained from the use of abortion vaccine were eminently satisfactory. In England, the Department of Fisheries and Agriculture has been using and recommending abortion vaccine for many years. The field experiences of hundreds of practicing veterinarians in the United States also have demonstrated the value of this method of control. By it, losses from abortion disease have been reduced to a negligible factor in a very considerable number of herds in this country.

Opponents to the use of living vaccine as a means of control of abortion disease, offer three objections to it.

First, it is claimed that vaccinated animals may spread the disease. The objection is not valid, for those who advocate the use of vaccine advocate it only in infected herds, herds in which the non-infected animals, if any exist, will speedily be exposed and presumably be infected anyhow. However, there is every reason to believe that the claim is not justified. The organisms used in the vaccine while highly antigenic are non-virulent.

The second argument used by the opponents of vaccination is that vaccination reduces the milk yield of vaccinated animals. There is no experimental data to justify this claim. It is probably based on the fact that a reduced milk yield is generally obtained from animals that are naturally infected. It by no means follows that the same will apply to an artificially immunized animal. We have excellent reasons for believing that the statement is not true. I have in mind an outstanding herd in this country containing world's champion milk and butter fat producers, which has been vaccinated every year. You couldn't persuade the owner of this herd that vaccination lowers the yield of milk or butter fat.

A third objection to vaccination that is frequently heard is that so long as abortion vaccine is being used, the disease cannot be eradicated. There are two perfectly fair answers to this objection. In the first place, the disease cannot be eradicated by any plan, method or means that we know of now regardless of vaccination. The second is that the vaccine organisms are non-virulent and not capable of reproducing the disease, and there is no reason why vaccination should hinder the application of any practical plan for eradication which may later be discovered.

The dairy industry is not in a mood or

in a financial condition to countenance any plan for the control of abortion disease by sanitation and isolation, even if a practical plan had been worked out, which is not the case. Under ordinary dairy conditions vaccination offers a practical and satisfactory method of reducing the abortion rate to 5% or less, regardless of what it may have been previous to vaccination.

It should be remembered that the cattle owner is interested in getting a normal calf crop. Since vaccination offers this possibility, there is no measure in fairness that justifies its condemnation. If a better plan is eventually developed, it should be adopted. If sanitary officials advocate an impractical plan which cannot succeed, that will but add to the resistance to the adoption of any plan which may later be discovered that has practical possibilities.

The future of the veterinary profession is assured provided it is able to work along common sense lines that are efficient and effective in the control of disease. However, if it indulges in idealistic, impractical recommendations, the future of the profession is slowly but surely being mortgaged.

Black Tongue of Dog a Nutritional Deficiency

Goldberger[8] and his associates have published a later report on the subject of black tongue in dogs which was discussed at length in VETERINARY MEDICINE for August.

This report is the record of an investigation into the black tongue preventive properties of various articles of diet and includes a description of 22 careful experiments, each with 5 to 7 or more dogs.

It was stated in our discussion last month that the investigators found their diet, known as basic pellagra diet No. 123, to unfailingly result in black tongue when fed to dogs. With rare exceptions, the onset of the disease occurred in less than 60 days.

[8] A Study of the Blacktongue-Preventive Action of 16 Foodstuffs, with Special Reference to the Identity of Blacktongue of Dogs and Pellagra of Man, by Joseph Goldberger and G. A. Wheeler, Surgeons, and R. D. Lillie and L. M. Rogers, Passed Assistant Surgeons, United States Public Health Service. In Public Health Reports, Vol. 43, No. 23.

The composition of this diet, given last month, is as follows:

Corn meal, 400 grams
Cowpeas, 50 grams
Casein (purified), 60 grams
Sucrose, 32 grams
Cod-liver oil, 15 grams
Sodium Chlorid, 10 grams
Calcium carbonate, 3 grams.

In the experiments under consideration, substitutions of various feeds in this diet were made without materially changing the number of calories or the amount of protein. The experiments were checked to a degree that makes the findings conclusive.

The findings, with regard to the black tongue preventive properties of these feeds are as follows:

Maize, if it contains any, is a poor source of the preventive for both blacktongue and pellagra.

Whole *wheat* contains the blacktongue preventive, but in small amount.

Commercial *wheat germ* contains, and may be rated as a relatively good source of, the preventive for both blacktongue and pellagra.

The *cowpea* contains, but is a poor source of, the preventive for both blacktongue and pellagra.

The *soy bean* contains the blacktongue preventive, but in relatively small amount, appreciably more, however, than the cowpea, but considerably less than the extracted wheat germ. So far as it goes the experience with the soy bean in the human disease is, at least, not inconsistent with that in the experimental disease of the dog.

Milk contains the preventive for both the human and the canine disease, but contains it in relatively small amount.

Butter, while not devoid of it, is a relatively very poor source of the blacktongue preventive, a conclusion that is in harmony with the experience with butter in pellagra.

Cod-liver oil would seem very poor in or lacking the preventive for both blacktongue and pellagra.

Cottonseed oil contains little, if any, of the preventive for blacktongue. No spe-

cific study of the effectiveness of this oil in pellagra has been made; on the basis of general experience it seems unlikely that this oil contains the pellagra preventive in significant amounts.

Beef muscle is a good source of the preventive for both blacktongue and pellagra.

Pork liver is a good source of the blacktongue preventive; it has not yet been studied in pellagra.

Canned salmon contains the blacktongue preventive. A study of its effectiveness in pellagra is in progress.

Egg yolk contains the blacktongue preventive; a specific study of its value in pellagra has not yet been undertaken.

The canned *tomato* contains the preventive for both blacktongue and pellagra, but in relatively small amount.

The *carrot* contains, but is a relatively poor source of, the preventive of blacktongue. Its reported failure in pellagra prevention is consistent with the indications of its feebleness as a blacktongue preventive.

The *rutabaga* turnip contains, but is a relatively poor source of, the blacktongue preventive. Its failure in pellagra prevention is consistent with its poverty in the blacktongue preventive.

Much interesting information concerning blacktongue aside from the blacktongue preventive properties of various feeds is given in this report, which is well worth studying by every veterinarian.

Goldberger's conclusions that experimental blacktongue of dogs and pellagra of man is the same thing, and due to the same cause, seems inescapable. The finding that experimental blacktongue is a dietary disease unfailingly preventable by the inclusion of certain feeds containing blacktongue preventive properties, notably lean meat and canned salmon, is equally conclusive. That animals affected with blacktongue, except in very advanced stages, promptly recover when given the black leg preventive which occurs abundantly in yeast, lean meat and salmon, and to a less extent in a number of other common foods, is of the greatest importance in the treatment of this condition.

It perhaps remains to be proved scientifically that experimental blacktongue and the disease as it naturally occurs is the same. To this phase of the subject, Goldberger gave no attention, the object of his investigation being an inquiry into the pellagra preventive properties of various foods.

However, there seems scarcely a doubt that the naturally occurring disease and the experimental disease are identical. The description of the symptoms and lesions as given by Goldberger are the same as those of the naturally occurring disease. Furthermore. Drs. M. R. Blackstock, L. T. Giltner and J. E. Shillinger, all well known veterinarians, familiar with the naturally occurring disease, examined experimental cases of blacktongue and pronounced them the same disease as cases of blacktongue occurring naturally.

In further support of the theory that the experimental and naturally occurring attacks of blacktongue are the same ailment might be cited the general belief of veterinarians that the latter is a nutritional ailment, due to insufficient meat in the diet.

Further evidence in support of the identity of the two ailments is found in the statements of Spencer that every case to which raw meat was given recovered; of Browning that the disease may be cured by milk and meat broth; of Stallworth that his cases recovered upon being fed salmon, and of Franks that the disease did not occur in his locality until the forests were cleared up and game was no longer available for the food of dogs, and then occurred only in the summer time when fresh meat was not available. Citations to the foregoing were given last month and need not be repeated here.

Without criticising the splendid work of Goldberger, we again point out that his report would have been improved had he given credit to the clinical observations of a number of veterinarians that clearly forecasted the findings which he scientifically proved.

Unfortunately in this report, Goldberger does not give the symptoms of the affected dogs, but merely states that blacktongue did

or did not occur, and the results therefore shed no light on fright disease, which the earlier reports indicated might possibly be a variant, possibly a milder form of the same nutritional deficiency.

Anaplasmosis in California

Anaplasmosis was first detected in California in 1925, and since then has been detected in seven counties in the State. These localities are free from Texas fever.

The disease was first detected in a herd which had been formed by purchase after the original herd had been slaughtered out on account of foot-and-mouth disease.

Eight animals had died in the course of about 6 months before accurate investigation was begun, and anaplasmosis was suspected by Boynton[6] because of the similarity between the lesions found and those of cases of anaplasmosis which he had examined in the Philippines.

Examination of blood smears from a sick cow revealed the presence of the parasite and evidences of anemia. Two attempts at infection of other animals by inoculation with blood containing the parasite failed.

Cases occurred on a neighboring farm the following year and 16 animals died. *Anaplasma marginale* and *centrale* were found.

From this outbreak successful experimental transmissions were made.

The period of incubation was found to be approximately 18 days. Physical symtoms and temperature reaction are not observed until about a week after the appearance of the parasite in the blood. During the febrile period corpuscles may be invaded up to 50 per cent.

The most prominent symptoms of the disease are anemia, jaundice, constipation muscular tremors, inappetence, fever and rapid emaciation.

The mortality observed has been high, particularly among milking cows.

The natural transmitter of the disease has not been identified.

[6] Observation on Anaplasma Marginale in cattle of California by W. H. Boynton, *Cornel Veterinarian*, Vol. 18, No. 1, Jan. 1928 Abstd in *Tropical Veterinary Bulletin*, London, Vol. 16, No. 4.

Anthelmintics Given with Bran

Rogers[7] *et al.* find that horses will take anthelmintic drugs simply mixed with bran mash. In this way they have given doses of 25 g. of carbon bisulphid, 100 g. of carbon tetrachlorid, 18 cc. of oil of chenopodium, oil of turpentine 80 to 100 cc. The doses are given twice—morning and evening. The drugs are first thoroughly mixed in about four litres of water, then bran is added by handfuls and thoroughly stirred with a stick. Six or seven litres of bran are added in this way.

Patients should be on a "sloppy" diet before treatment is begun and they should be starved for 36 hours immediately before.

The rate at which animals take the medicated bran varies considerably. Some—and these form the minority—eat it up quickly, while others eat only a little at a time, and thus may require two hours or more to finish the meal.

Generally, the second feed is eaten more quickly than the first. Animals which will not eat bran containing vermifuges may be persuaded to do so by continuing the starvation and by administering a saline purgative each day. There is no risk attaching to even long starvation if a purgative is given daily.

For oxyuris the authors have given arecolin hydrobromid mixed with powdered charcoal.

Congenital Defect of Calves

In certain strains of Holstein cattle in Wisconsin, calves are occasionally born with epithelial defects of the skin below the knees and hocks, defective integument of the muzzle and of the ears. The calves invariably die of infection of the exposed flesh. Hadley[8] first observed this 15 years ago and has compiled and studied a record of 50 cases, 13 of them occurring in one herd. The defect is heritable and recessive. It is brought to light by in-breeding in strains containing the defect.

[7] A Practical Method of Administering Anthelmintics by Roger, Jouveaux and Plateau. Bull. Acad. Vet. de France, Vol. 1 Jan. 1928. Abstd. in *Tropical Veterinary Bulletin*, London, Vol. 16, No. 4.

[8] Congenital Epithelial Defects of Calves by F. B. Hadley; *Journal of Heredity* Vol. XVIII, No. 11, November 1927.

Fifty Million Tuberculin Tests

More than fifty million official tuberculin tests have been made under the cooperative plan for the eradication of bovine tuberculosis since the work was undertaken 11 years ago, and this enormous number is being added to at the rate of approximately a million tests a month.

An imposing list of cities now require that all cows supplying milk for distribution within those cities shall have passed a tuberculin test within a year and the number of such cities is increasing steadily. Hundreds of countries are included in areas having less than 0.5 per cent of tuberculous cattle, and the percentage of tuberculous cattle reaching the abattoirs is steadily falling.

When in 1917 the eradication of tuberculosis from all the cattle in the country was undertaken, it was realized that it was the most monumental livestock sanitary problem ever attempted by any people, and the most ambitious. It was estimated that it might require 50 years to accomplish it. It now appears that, barring unlooked-for setbacks to the program, it will be accomplished within half of that period.

Throughout the work has been carried on cooperatively by the Federal and the state governments and voluntarily by the livestock owners. When it is recalled that, with but three exceptions, the much older countries of Europe have not even attempted the task of freeing their herds from tuberculosis, the heaviest economic tax upon the cattle industry, and a public health problem of the first magnitude, the achievements of this country become all the more impressive. Further of the three countries of Europe that have undertaken bovine tuberculosis control, Denmark, Germany and Great Britain, none has made any substantial progress in the work, nor does their plan, the removal of clinical cases of tuberculosis only, offer any promise of either eradicating the disease or lessening its prevalence. The best that can be accomplished under such a plan, if we may judge by the 25-year record of Denmark, is to prevent an increase in the prevalence of the disease. If B. C. G. vaccination should prove as efficient as its originators claim it is, there is hope for these countries; if it does not they must begin at some future time, where they might have begun years ago, to eradicate this disease by the only known method of eradicating it—the removal of all infected animals from all the herds of the country. And when commendation and congratulations are being set forth on the progress made in bovine tuberculosis eradication it should not be forgotten that although this could not have been accomplished without federal and state aid or the cooperation of the cattle industry, neither could it have been accomplished without a numerous and skilled veterinary profession composed of men of high integrity and loyalty to the public service. In the last analysis, the program of bovine tuberculosis eradication is, and will continue to be, a success just in the degree that the veterinarians who carry it out are skilled in its application and loyal to the public that depends upon them.

Ernest and Lash,[9] in a recent discussion of tuberculin testing, review the experience of the Bureau of Animal Industry in its supervision of the cooperative tuberculosis eradication plan since its inception. The three officially recognized tests—subcutaneous or thermal test, intradermic or skin test, and the ophthalmic or eye test—are fully described. The comparative importance of the three tests is shown by the statement that from October 1, 1920 when the intradermic test was officially recognized to June 30, 1927, 30 million intradermic, a half million subcutaneous and ten thousand ophthalmic tests were made. Thus the intradermic test may be said to be the basis upon which the eradication program is builded.

In this connection it may be recalled that during the first three years of the cooperative eradication work, and for a number of years before that, certain state livestock sanitary officials stood out against the inter-

[9] Tuberculin Testing of Livestock by L. B. Ernest and Elmer Lash, Veterinary Inspectors, Tuberculosis Eradication Division of the Bureau of Animal Industry. United States Department of Agriculture circular No. 249. 26 PP. illus. March, 1928.

dermic tuberculosis test although its dependability had been fully established and its superiority over all other tests in the facility and economy with which it could be applied were as well known then as now. By refusing to recognize this test for interstate shipments and opposing its use in the cooperative work, these reactionary officials were responsible for the waste of hundreds of thousands of dollars of public money, expended for the application of the more expensive subcutaneous test.

Veterinarians are of course familiar with most of the discussion given in the bulletin under review. They will find, however, particularly those not engaged in tuberculosis eradication, some valuable information in the discussion of the combination tests. Of these tests the authors say:

The intradermic-ophthalmic-subcutaneous combination is undoubtedly the most searching combination which can be used. It has assumed a prominent place in the testing work in a number of states. It is found in this grouping that an occasional reactor results from one of the tests which is not detected by either of the other two, and this is especially true in some badly infected herds.

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The subcutaneous-ophthalmic combination test is one very much used, and it has been found to give very satisfactory results. It is recommended that this combination be alternated with the intradermic-ophthalmic test wherever continuing infection is found in herds.

The intradermic-ophthalmic combination test, if properly applied, is more desirable for purposes of economy and practicability than any other. Information at hand indicates that these two tests afford an excellent check against each other, and that the results following their use have been very good.

The subcutaneous-intradermic combination test affords no special features, and is not recommended.

Full directions are given for applying and interpreting the various combination tests.

Blood Count Diagnostic for Hog Cholera

Dr. R. E. Shope, research veterinarian for the Rockefeller Institute, has made a preliminary announcement to Eastern Iowa Veterinarians of a blood test for the diagnosis of hog cholera that can be applied easily and quickly in the field and that is conclusive in results.

According to Doctor Shope, there is a rapid fall in the number of leukocytes in the blood of cholera-infected swine; and there are prompt and practical methods of determining this variation in the blood count. So far as his experiments have gone, there is no other disease of swine that occasions this phenomenon. In all other diseases of swine so far investigated there is an increase in the leukocyte count; hence the diminution of leukocytes becomes diagnostic of hog cholera.

A number of years ago (in 1914) R. R. Dinwiddie of the University of Arkansas in bulletin No. 120 of the Arkansas Agricultural Experiment Station published the following on this subject:

"Hog cholera infection gives rise at an early stage to a pronounced leucopenia, with the appearance of numerous atypical mononuclear or transitional leucocytes. When inflammatory complications occur a polymorph leucocytosis appears. The destruction of red corpuscles is not a prominent feature of the disease."

Recent investigations indicate that clinical cases of blackleg are not always caused by the blackleg bacillus, but para blackleg bacilli and the bacillus of malignant edema may be the cause. This may explain some of the losses that occur in calves after having been immunized against blackleg.—*Bact. Abst.* Vol. 9 No. 4.

CORRECTION

In the third line on page 314 of the July issue of VETERINARY MEDICINE occurs a reference to the work of Dr. "Black." Beach (of California) was intended.